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## PROJECT REPORT

**CNX Gas Company LLC  
Shirley 3/40 Wellpad**

### G70-D Permit Application

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## 1. INTRODUCTION

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CNX Gas Company LLC (CNX) is submitting this Class II General Permit (G70-D) application to the West Virginia Department of Environmental Protection (WVDEP) for a natural gas production facility located in Tyler County, West Virginia (Shirley 3/40 facility). Shirley 3/40 (SHR-3/40) consists of two aggregated natural gas well pads (Shirley 3 and Shirley 40), based on common ownership, proximity, and shared equipment. With this G70-D permit application, CNX is requesting the approval for the construction and operation of the equipment that is proposed for both natural gas production facilities. CNX proposes to locate the proposed support equipment on SHR 40.

### 1.1. FACILITY AND PROJECT DESCRIPTION

The SHR 3/40 pad is a natural gas production facility that currently consists of eight (8) natural gas wells. Natural gas and liquids (including water and condensate) are extracted from deposits underneath the surface. The liquids produced are stored in storage vessels.

CNX plans to install the following equipment at the facility:

- > Four (4) 400 barrel (bbl) condensate storage tanks; controlled by one (1) vapor recovery unit, powered by one (1) natural gas fired 46 hp Gas jack GJ230 natural gas fired engine;
- > Four (4) 400 barrel (bbl) produced water storage tanks; controlled by the aforementioned vapor recovery unit;
- > Two (2) natural gas fired 46 hp Gas jack GJ230 natural gas fired flash compressor engines;
- > Eight (8) natural gas fired gas processing units, each rated at 1.0 MMBtu/hr (heat input);
- > One (1) Heater Treater with its respective heater rated at 1.0 MMBtu/hr (heat input); Vapors from the heater treater will be routed to the sales line by the Gas Jack Compressor engines;
- > One (1) produced gas flare (with a max flow rating of 26.2 MMBtu/hr);
- > One (1) line heater rated at 1.5 MMBtu/hr (heat input);
- > One (1) LEED vapor combustor unit, rated at a maximum capacity of 8.69 MMBtu/hr. The enclosed combustor will provide backup control to the storage tanks (condensate and produced water) during periods of VRU downtime
- > Condensate truck loading;
- > Produced water truck loading; and
- > Associated piping and components.

A process flow diagram is included as Attachment D. A comparison of the potential emissions of the proposed equipment at the wellpad in comparison with G70-D emission limits is provided in Table 1. Facility emissions are well below the permit limits. Note that in accordance with condition 1.1.1. of the G70-D permit, fugitive emissions are not considered in determining eligibility of the permit.

**Table 1 - Comparison of Wellpad Potential Emissions to G70-D Permit Emission Limits**

Pollutant	Wellpad Potential Annual Emissions (tpy)	G70-D Maximum Annual Emission Limits (tpy)
Nitrogen Oxides	17.93	50
Carbon Monoxide	47.25	80
Volatile Organic Compounds	13.56	80
Particulate Matter – 10/2.5	0.69	20
Sulfur Dioxide	0.05	20
Individual HAP (n-hexane) <sup>1</sup>	0.73	8
Total HAP <sup>1</sup>	1.56	20

1. Includes fugitive emissions

## 1.2. SOURCE STATUS

WVDEP must make stationary source determinations on a case-by-case basis using the guidance under the Clean Air Act (CAA) and EPA's and WVDEP's implementing regulations. The definition of stationary source in 40 CFR 51.166(b) includes the following:

*"(6) Building, structure, facility, or installation means all of the pollutant emitting activities which belong to the same industrial grouping, are located on or more contiguous or adjacent properties, and are under control of the same person (or persons under common control)."*

Other additional pollutant emitting facilities should be aggregated with the SHR 3/40 Pad for air permitting purposes if, and only if, all three elements of the "stationary source" definition above are fulfilled.

SHR-3/40 consists of two natural gas well pads (Shirley 3 and Shirley 40), which have been aggregated based on external communications with WVDEP since both facilities are within a quarter mile radius and are commonly owned by CNX Gas Company, LLC . Additionally, as it relates to stationary source determinations, CNX would like to acknowledge as part of this application that maximum potential emissions from the storage tank associated with the conventional well (Well 12386), located within a quarter mile radius of the SHR-3/40 facility (see attached map in Attachment A) have been aggregated with the SHR-3/40.

There are no more additional Marcellus facilities within the quarter mile radius from SHR-3/40. Therefore, the SHR 3/40 pad should be considered a separate stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration (PSD). As discussed in this application, the SHR-3/40 facility is a minor source of air emissions with respect to New Source Review (NSR) and Title V permitting

### 1.3. G70-D APPLICATION ORGANIZATION

This West Virginia Code of State Regulations, Title 45 (CSR) Series 13 (45 CSR 13) G70-D permit application is organized as follows:

- > Section 2: Sample Emission Source Calculations;
- > Section 3: Regulatory Discussion;
- > Section 4: G70-D Application Form;
- > Attachment A: Single Source Determination;
- > Attachment B: Siting Criteria Waiver (**Not Applicable**);
- > Attachment C: Business Certificate;
- > Attachment D: Process Flow Diagram;
- > Attachment E: Process Description;
- > Attachment F: Plot Plan;
- > Attachment G: Area Map;
- > Attachment H: G70-D Section Applicability Form;
- > Attachment I: Emission Units Table;
- > Attachment J: Fugitive Emissions Summary Sheet;
- > Attachment K: Gas Well Data Sheet;
- > Attachment L: Storage Vessel Data Sheet;
- > Attachment M: Heaters Data Sheet;
- > Attachment N: Engines Data Sheet;
- > Attachment O: Truck Loading Data Sheet;
- > Attachment P: Glycol Dehydrator Data Sheet (**Not Applicable**);
- > Attachment Q: Pneumatic Controller Data Sheet
- > Attachment R: Pneumatic Pump Data Sheet (**Not Applicable**);
- > Attachment S: Air Pollution Control Device Data Sheet;
- > Attachment T: Emission Calculations;
- > Attachment U: Emission Summary Sheet;
- > Attachment V: Class I Legal Advertisement; and
- > Attachment W: General Permit Registration Application Fee.

## 2. SAMPLE EMISSION SOURCE CALCULATIONS

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The characteristics of the air emissions from the natural gas production operations, along with the methodology for calculating these emissions, are briefly described in this section of the application. Detailed emission calculations are presented in Attachment S of this application.

Emissions from this project will result from natural gas combustion in the VRU and flash gas compressor engines, heaters and gas processing units, enclosed combustor, and flare, as well as storage of organic liquids in storage tanks and loading of organic liquids into tank trucks. In addition, fugitive emissions will result from component leaks from the operation of the production facility. The method by which emissions from each of these source types, as well as the existing source types, are calculated is summarized below.

- > **Heaters and Enclosed Combustors:** Potential emissions of criteria pollutants and hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for natural gas external combustion.<sup>1</sup> These calculations assume a site-specific heat content of natural gas. Greenhouse gas emissions are calculated according to 40 CFR 98 Subpart C.<sup>2</sup>
- > **VRU and Flash Gas Compressor Engines:** Potential emissions of oxides of nitrogen (NOx), carbon monoxide (CO), and volatile organic compounds (VOC) are calculated using vendor data. The remaining criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 factors for natural gas fired engines. These calculations assume a specific heat content of natural gas from a close-by wellpad (SHL 3-B). Greenhouse gas emissions are calculated according to 40 CFR 98 Subpart C.
- > **Fugitive Equipment Leaks:** Emissions of VOC and HAPs from leaking equipment components have been estimated using facility estimated component counts and types along with emission factors from the *Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995*. Emission factors are based on average measured TOC from component types indicated. Greenhouse gas emissions from component leaks are calculated according to the procedures in 40 CFR 98 Subpart W.<sup>4</sup> Pneumatic devices at the wellpad are intermittent bleed and are assumed to be in operation 1/3 of the year.
- > **Storage Tanks:** Working, breathing and flashing emissions of VOC and HAPs from the storage tanks at the facility are calculated using Bryan Research & Engineering ProMax® Software. Controlled calculations assume an overall control efficiency (capture and destruction) of 98%. The throughput for the produced fluids tanks are based on engineering estimates for the production of the proposed new wells. The composition for the analysis was from a sample taken at SHL-3 (a pad with similar operations to SHR 3/40). The produced fluids throughput is calculated as follows:

$$\text{Throughput } \left( \frac{\text{bbl}}{\text{day}} \right) = \left( \text{Condensate Throughput } \left( \frac{\text{bbl}}{\text{month}} \right) + \left( \text{Produced Water Throughput } \left( \frac{\text{bbl}}{\text{month}} \right) \right) \right) * \frac{12 \left( \frac{\text{months}}{\text{year}} \right)}{365 \left( \frac{\text{days}}{\text{year}} \right)}$$

- > **Tank Truck Loading:** Uncontrolled emissions of VOC and HAPs from the loading of organic liquids from storage tanks to tank truck are calculated using Bryan Research Engineering ProMax® Software. U.S. EPA's AP-42 Chapter 5 Section 2 factors were used for capture efficiency.<sup>5</sup>
- > **Haul Roads:** Fugitive dust emitted from facility roadways has been estimated using projected vehicle miles traveled along with U.S. EPA's AP-42 factors for unpaved haul roads.<sup>3</sup>

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<sup>1</sup> U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 1.4, Natural Gas Combustion, Supplement D, July 1998.

<sup>2</sup> 40 CFR 98 Subpart C, *General Stationary Fuel combustion Sources*, Tables C-1 and C-2.

<sup>3</sup> U.S. EPA, AP 42, Fifth Edition, Volume I, Section 13.2.2, Unpaved Roads, November 2006.

## **3. REGULATORY DISCUSSION**

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This section documents the applicability determinations made for Federal and State air quality regulations. In this section, applicability or non-applicability of the following regulatory programs is addressed:

- > Prevention of Significant Deterioration permitting;
- > Title V of the 1990 Clean Air Act Amendments;
- > New Source Performance Standards (NSPS);
- > National Emission Standards for Hazardous Air Pollutants (NESHAP); and
- > West Virginia State Implementation Plan (SIP) regulations.

This review is presented to supplement and/or add clarification to the information provided in the WVDEP G70-D permit application forms.

In addition to providing a summary of applicable requirements, this section of the application also provides non-applicability determinations for certain regulations, allowing the WVDEP to confirm that identified regulations are not applicable to the wellpad. Note that explanations of non-applicability are limited to those regulations for which there may be some question of applicability specific to the operations at the wellpad. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

### **3.1. PREVENTION OF SIGNIFICANT DETERIORATION SOURCE CLASSIFICATION**

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration. PSD regulations apply when a major source makes a change, such as installing new equipment or modifying existing equipment, and a significant increase in emissions results from the change. The SHR 3/40 wellpad is not a major source with respect to the PSD program since its potential emissions are below all the PSD thresholds. As such, PSD permitting is not triggered by this construction activity. CNX will monitor future construction activities at the site closely and will compare any future increase in emissions with the PSD thresholds to ensure these activities will not trigger this program.

### **3.2. TITLE V OPERATING PERMIT PROGRAM**

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia CSR 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP and 100 tpy of all other regulated pollutants. The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the SHR 3/40 wellpad is not a major source for Title V purposes.

### **3.3. NEW SOURCE PERFORMANCE STANDARDS**

New Source Performance Standards, located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the wellpad. The following NSPS could potentially apply to the wellpad:

- > 40 CFR Part 60 Subparts D/Da/Db/Dc – Steam Generating Units
- > 40 CFR Part 60 Subpart K/Ka/Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids
- > 40 CFR Part 60 Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines

- > 40 CFR Part 60 Subpart 0000 – Crude Oil and Natural Gas Production, Transmission, and Distribution
- > 40 CFR Part 60 Subpart 0000a – Crude Oil and Natural Gas Facilities

### **3.3.1. NSPS Subparts D, Da, Db, and Dc - Steam Generating Units**

These subparts apply to steam generating units of various sizes, all greater than 10 MMBtu/hr. The proposed project does not include any steam generating units with a heat input greater than 10 MMBtu/hr, therefore the requirements of these subparts do not apply.

### **3.3.2. NSPS Subparts K, Ka, and Kb - Storage Vessels for Petroleum Liquids/Volatile Organic Liquids**

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Both Subparts K and Ka apply to storage tanks with a capacity greater than 40,000 gallons. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m<sup>3</sup> (~19,813 gallons). All of the tanks at the wellpad have a capacity of 19,813 gallons or less. As such, Subparts K, Ka, and Kb do not apply to the storage tanks at the wellpad.

### **3.3.3. NSPS Subparts JJJJ - Stationary Spark Ignition Internal Combustion Engines**

New Source Performance Standards 40 CFR Part 60 Subpart JJJJ (NSPS JJJJ) affects owners and operators of stationary spark ignition internal combustion engines (SI ICE) that commence construction, reconstruction or modification after June 12, 2006. Applicability dates are based on the date the engine was ordered by the operator. The Gas Jack GJ230 engines (3S-ENG1, 3S-ENG2, and 3S-ENG3) are 4-stroke rich burn, spark ignition engines manufactured after January 1, 2011, and is subject to this subpart. CNX will operate the engines according to the manufacturer's recommended practices and demonstrate compliance with the requirements specified in 40 CFR §60.4244 (testing methods) and 40 CFR§60.4243 (maintenance plan/records and performance testing frequency) for noncertified affected SI ICE at the facility.

### **3.3.4. NSPS Subpart 0000 - Crude Oil and Natural Gas Production, Transmission, and Distribution**

Subpart 0000, Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011 and or before September 18, 2015. This NSPS was published in the Federal Register on August 16, 2012, and subsequently amended. The proposed project does not change applicability dates with respect to NSPS Subpart 0000 for existing equipment. Therefore, this subpart is not applicable to the proposed project. Note that EPA recently finalized 40 CFR 60 Subpart 0000a; applicability of Subpart 0000a is discussed in the following section.

### **3.3.5. NSPS Subpart 0000a—Crude Oil and Natural Gas Facilities**

Subpart 0000a, Standards of Performance for Crude Oil and Natural Gas Facilities, applies to affected facilities that commenced construction, reconstruction, or modification after September 18, 2015. The regulation was published final in the Federal Register on June 3, 2016. The rule includes provisions for the following facilities:

- > Hydraulically fractured wells;
- > Centrifugal compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;
- > Reciprocating compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;

- > Continuous bleed natural gas-driven pneumatic controllers with a bleed rate of > 6 scfh located in the production, gathering, processing, or transmission and storage segments (excluding natural gas processing plants);
- > Continuous bleed natural gas-driven pneumatic controllers located at natural gas processing plants;
- > Pneumatic pumps located in the production and processing segments;
- > Storage vessels located in the production, gathering, processing, or transmission and storage segments;
- > The collection of fugitive emissions components at a well site;
- > The collection of fugitive emissions components at a compressor station; and
- > Sweetening units located onshore that process natural gas produced from either onshore or offshore wells.

Based on the rule, the following paragraphs describe the applicability of the facilities to be located at the SHR 3/40 wellpad.

40 CFR 60.5385 requires owners and operators of affected reciprocating compressors to change the rod packing prior to operating 26,000 hours or prior to 36 months since start up or the last packing replacement. However, according to §60.5365a, compressors located at well sites are not affected facilities under Subpart OOOOa. As such, the flash gas compressors (3S-ENG1, 3S-ENG2, and 3S-ENG3) will not be an affected facility in this subpart.

There are eight (8) produced fluid (four (4) condensate and four (4) produced water) storage vessels at the wellpad. The storage vessels at the facility will each have potential VOC emissions less than 6 tpy based on the permit application materials and enforceable limits to be included in the G70-D permit. As such, per 60.5365a(e), the tanks will not be storage vessel affected facilities under the rule.

The collection of fugitive emission sources at the SHR 3/40 well pad will be an affected facility under 60.5365a(i). Therefore, CNX will be required to monitor all fugitive emission components (ex. connectors, flanges, etc.) with an optical gas imaging (OGI) device, and repair all sources of fugitive emissions in accordance with the rule. CNX must also develop a corporate-wide monitoring plan and a site specific monitoring plan (or one plan that incorporates all required elements), and conduct surveys on a semi-annual basis. CNX is also subject to the applicable recordkeeping and reporting requirements of the rule

Per 60.5365a(d)(1), a pneumatic controller affected facility is a single continuous bleed natural gas driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh. Per 60.5365a(h)(1), a pneumatic pump for well sites is defined as a single natural gas-driven diaphragm pump. SHR 3/40 does not have any pneumatic controller or pneumatic pump that meet these definitions, therefore the requirements for these equipment do not apply.

### **3.3.6. Non-Applicability of All Other NSPS**

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subparts OOOO) and associated equipment (Subparts D-Dc and K-Kb), the applicability of a particular NSPS to the wellpad can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to the proposed project.

## **3.4. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS**

Part 63 NESHAP allowable emission limits are established on the basis of a maximum achievable control technology (MACT) determination for a particular major source. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. The wellpad is an Area (minor) source of HAP since its potential emissions of HAP are less than the 10/25 major source thresholds. NESHAP apply to sources in specifically regulated industrial source categories (Clean Air Act Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type. Besides 40 CFR 63 Subpart A (NESHAP Subpart A), which is similar to 40 CFR 60 Subpart A (NSPS Subpart A), the following NESHAP could potentially apply to the wellpad:

- > 40 CFR Part 63 Subpart HH – Oil and Natural Gas Production Facilities
- > 40 CFR Part 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines
- > 40 CFR Part 63 Subpart JJJJJ – Industrial, Commercial, and Institutional Boilers

The applicability of these NESHAP Subparts is discussed in the following sections.

### **3.4.1. 40 CFR 63 Subpart HH - Oil and Natural Gas Production Facilities**

This standard contains requirements for both major and area sources of HAP. At area sources, the only affected source is a triethylene glycol dehydration unit (§63.760(b)(2)). The SHR 3/40 wellpad does not include a triethylene glycol dehydration unit; therefore the requirements of this subpart do not apply.

### **3.4.2. 40 CFR 63 Subpart ZZZZ - Stationary Reciprocating Internal Engines**

This rule affects reciprocating internal combustion engines (RICE) located at a major and area sources of HAP. 40 CFR §63.6590(c) states that a new or reconstructed stationary RICE located at an area HAP source must meet the requirements of NESHAP Subpart ZZZZ by meeting the requirements of NSPS Subpart JJJJ. No further requirements apply for such engines under NESHAP Subpart ZZZZ. The SHR 3/40 well pad is a minor (area) source of hazardous air pollutants and the engines (3S-ENG1, 3S-ENG2, and 3S-ENG3) are considered a new stationary RICE. Therefore, the requirements contained in §63.6590(c) are applicable. CNX will be in compliance with applicable requirements of 40 CFR 63 Subpart ZZZZ by meeting the applicable requirements of 40 CFR 60 Subpart JJJJ.

### **3.4.3. 40 CFR 63 Subpart JJJJJ - Industrial, Commercial, and Institutional Boilers**

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types at area sources. The gas processing units and line heater are natural gas-fired and are specifically exempt from this subpart. Therefore, no sources at the wellpad are subject to any requirements under 40 CFR 63 Subpart JJJJJ.

## **3.5. WEST VIRGINIA SIP REGULATIONS**

The SHR 3/40 wellpad is potentially subject to regulations contained in the West Virginia Code of State Regulations, Chapter 45 (Code of State Regulations). The Code of State Regulations fall under two main categories, those regulations that are generally applicable (e.g., permitting requirements), and those that have specific applicability (e.g., PM standards for manufacturing equipment).

### **3.5.1. 45 CSR 2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers**

45 CSR 2 applies to fuel burning units, defined as equipment burning fuel “for the primary purpose of producing heat or power by indirect heat transfer”. The gas processing units and line heater are fuel burning units and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from units shall not exceed 10 percent.

### **3.5.2. 45 CSR 4: To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor**

According to 45 CSR 4-3:

*No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.*

The wellpad is generally subject to this requirement. However, due to the nature of the process at the wellpad, production of objectionable odor from the wellpad during normal operation is unlikely.

### **3.5.3. 45 CSR 6: Control of Air Pollution from the Combustion of Refuse**

45 CSR 6 applies to activities involving incineration of refuse, defined as “the destruction of combustible refuse by burning in a furnace designed for that purpose. For the purposes of this rule, the destruction of any combustible liquid or gaseous material by burning in a flare or flare stack, thermal oxidizer or thermal catalytic oxidizer stack shall be considered incineration.” The enclosed combustor and flare are incinerators and therefore must comply with this regulation. Per 45 CSR 6-4.3, opacity of emissions from this unit shall not exceed 20 percent, except as provided by 4.4. PM emissions from this unit will not exceed the levels calculated in accordance with 6-4.1.

### **3.5.4. 45 CSR 16: Standards of Performance for New Stationary Sources**

45 CSR 16-1 incorporates the federal Clean Air Act (CAA) standards of performance for new stationary sources set forth in 40 CFR Part 60 by reference. As such, by complying with all applicable requirements of 40 CFR Part 60 at the wellpad, CNX will be complying with 45 CSR 16.

### **3.5.5. 45 CSR 17: To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter**

According to 45 CSR 17-3.1:

*No person shall cause, suffer, allow or permit fugitive particulate matter to be discharged beyond the boundary lines of the property lines of the property on which the discharge originates or at any public or residential location, which causes or contributes to statutory air pollution.*

Due to the nature of the activities at the wellpad, it is unlikely that fugitive particulate matter emissions will be emitted under normal operating conditions. However, CNX will take measures to ensure any fugitive particulate matter emissions will not cross the property boundary should any such emissions occur.

### **3.5.6. 45 CSR 21-28: Petroleum Liquid Storage in Fixed Roof Tanks**

45 CSR 21-28 applies to any fixed roof petroleum liquid storage tank with a capacity greater than 40,000 gallons. The capacity of each storage tank proposed for the wellpad is less than 40,000 gallons; therefore, 45 CSR 21-28 will not apply to the petroleum liquid storage tanks at this wellpad.

### **3.5.7. 45 CSR 34: Emissions Standards for Hazardous Air Pollutants**

45 CSR 34-1 incorporates the federal Clean Air Act (CAA) national emissions standards for hazardous air pollutants (NESHAPs) as set forth in 40 CFR Parts 61 and 63 by reference. As such, by complying with all applicable requirements of 40 CFR Parts 61 and 63 at the wellpad, CNX will be complying with 45 CSR 34. Note that there are no applicable requirements under 40 CFR Parts 61 and 63 for the wellpad.

### **3.5.8. Non-Applicability of Other SIP Rules**

A thorough examination of the West Virginia SIP rules with respect to applicability at the wellpad reveals many SIP regulations that do not apply or impose additional requirements on operations. Such SIP rules include those specific to a particular type of industrial operation that is categorically not applicable to the wellpad.

## **4. G70-D APPLICATION FORMS**

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The WVDEP permit application forms contained in this application include all applicable G70-D application forms including the required attachments.



west virginia department of environmental protection

Division of Air Quality  
601 57<sup>th</sup> Street SE  
Charleston, WV 254  
Phone (304) 926-0475  
Fax (304) 926-0479  
[www.dep.wv.gov](http://www.dep.wv.gov)

## G70-D GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION,  
RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF  
NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

CONSTRUCTION  
 MODIFICATION  
 RELOCATION

CLASS I ADMINISTRATIVE UPDATE  
 CLASS II ADMINISTRATIVE UPDATE

### SECTION 1. GENERAL INFORMATION

Name of Applicant (as registered with the WV Secretary of State's Office): CNX Gas Company LLC

Federal Employer ID No. (FEIN): 550738862

Applicant's Mailing Address: 1000 CONSOL Energy Drive

City: Canonsburg

State: PA

ZIP Code: 15317

Facility Name: Shirley 3/40 (SHR 3/40) Production Facility

Operating Site Physical Address:

If none available, list road, city or town and zip of facility.

City: Alma

Zip Code: 26320

County: Tyler

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):

Latitude: 39.41417°

Longitude: -80.83432°

SIC Code: 1311

NAICS Code: 211111

DAQ Facility ID No. (For existing facilities)

### CERTIFICATION OF INFORMATION

This G70-D General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of the Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. Any administratively incomplete or improperly signed or unsigned G70-D Registration Application will be returned to the applicant. Furthermore, if the G70-D forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.

I hereby certify that Craig Neal is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Division of Air Quality immediately.

I hereby certify that all information contained in this G70-D General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible.

Responsible Official Signature: Craig Neal

Name and Title: Craig Neal, VP Gas Operations  
Email: [CraigNeal@consolenergy.com](mailto:CraigNeal@consolenergy.com)

Phone: (724) 485-4000  
Date:

Fax:

If applicable:

Authorized Representative Signature: \_\_\_\_\_

Name and Title:  
Email:

Phone:  
Date:

Fax:

If applicable:

Environmental Contact

Name and Title: Patrick Flynn, Air Quality Engineer  
Email: [PatrickFlynn@consolenergy.com](mailto:PatrickFlynn@consolenergy.com)

Phone: (724) 485-3156  
Date:

Fax:

## OPERATING SITE INFORMATION

Briefly describe the proposed new operation and/or any change(s) to the facility:

CNX Gas Company LLC (CNX) is proposing to construct a new production facility (SHR 3/40 pad), which will consist of the following equipment: eight (8) wells, eight (8) gas processing units (GPUs), four (4) produced water storage tanks, four (4) condensate storage tanks, two (2) 46 bhp natural gas-fired compressor engines, one (1) 46 bhp natural gas fired vapor recovery unit engine, one (1) 1.5 MMBtu line heater, one (1) 1.0 MMBtu heater treater, one (1) 8.69 MMBtu/hr enclosed ground flare and one 26.2 MMBtu/hr flare.

Directions to the facility:

From I-79, take exit 119 and follow Route 50 west for 29 miles. Turn right onto WV-18 N (travel 0.6 miles). Turn left onto Davis street (travel 0.4 miles). Turn right onto WV-18 N/Sistersville Pile and travel for 15.6 miles. The facility would be on your right.

## ATTACHMENTS AND SUPPORTING DOCUMENTS

### **I have enclosed the following required documents:**

Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Check attached to front of application.<br><input type="checkbox"/> I wish to pay by electronic transfer. Contact for payment (incl. name and email address):<br><input type="checkbox"/> I wish to pay by credit card. Contact for payment (incl. name and email address): | <input type="checkbox"/> \$500 (Construction, Modification, and Relocation) <input type="checkbox"/> \$300 (Class II Administrative Update)<br><input checked="" type="checkbox"/> \$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ, OOOO and/or OOOOa <sup>1</sup><br><input type="checkbox"/> \$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH <sup>2</sup> |
|---|---|
- <sup>1</sup> Only one NSPS fee will apply.  
<sup>2</sup> Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ.  
*NSPS and NESHAP fees apply to new construction or if the source is being modified.*
- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Responsible Official or Authorized Representative Signature (if applicable)  | <input checked="" type="checkbox"/> Single Source Determination Form ( <b>must be completed</b> ) – Attachment A |
| <input type="checkbox"/> Siting Criteria Waiver (if applicable) – Attachment B   | <input checked="" type="checkbox"/> Current Business Certificate – Attachment C                                  |
| <input checked="" type="checkbox"/> Process Flow Diagram – Attachment D  | <input checked="" type="checkbox"/> Process Description – Attachment E   |
| <input checked="" type="checkbox"/> Plot Plan – Attachment F   | <input checked="" type="checkbox"/> Area Map – Attachment G  |
| <input checked="" type="checkbox"/> G70-D Section Applicability Form – Attachment H  | <input checked="" type="checkbox"/> Emission Units/ERD Table – Attachment I                                      |
| <input checked="" type="checkbox"/> Fugitive Emissions Summary Sheet – Attachment J  |  |
| <input checked="" type="checkbox"/> Gas Well Affected Facility Data Sheet (if applicable) – Attachment K   |  |
| <input checked="" type="checkbox"/> Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L |  |
| <input checked="" type="checkbox"/> Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M  |  |
| <input checked="" type="checkbox"/> Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N   |  |
| <input checked="" type="checkbox"/> Tanker Truck/Rail Car Loading Data Sheet (if applicable) – Attachment O  |  |
| <input type="checkbox"/> Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P               |  |
| <input checked="" type="checkbox"/> Pneumatic Controllers Data Sheet – Attachment Q  |  |
| <input checked="" type="checkbox"/> Pneumatic Pump Data Sheet – Attachment R   |  |
| <input checked="" type="checkbox"/> Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment S                     |  |
| <input checked="" type="checkbox"/> Emission Calculations (please be specific and include all calculation methodologies used) – Attachment T   |  |
| <input checked="" type="checkbox"/> Facility-wide Emission Summary Sheet(s) – Attachment U   |  |
| <input checked="" type="checkbox"/> Class I Legal Advertisement – Attachment V   |  |
| <input checked="" type="checkbox"/> One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments  |  |

**ATTACHMENT A**

**Single Source Determination**

**All attachments must be identified by name, divided into sections, and submitted in order.**

**ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM**

Classifying multiple facilities as one “stationary source” under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of Building, structure, facility, or installation as given in §45-14-2.13 and §45-19-2.12. The definition states:

*“Building, Structure, Facility, or Installation” means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same “Major Group” (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).*

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term “adjacent” and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.

Is there equipment and activities in the same industrial grouping (defined by SIC code)?

Yes  No

Is there equipment and activities under the control of the same person/people?

Yes  No

Is there equipment and activities located on the same site or on sites that share equipment and are within ¼ mile of each other?

Yes  No

**ATTACHMENT B**

**Siting Criteria Waiver (*Not Applicable*)**

**ATTACHMENT B - SITING CRITERIA WAIVER (NOT APPLICABLE)**

If applicable, please complete this form and it must be notarized.

**G70-D General Permit  
Siting Criteria Waiver**

**WV Division of Air Quality 300' Waiver**

I \_\_\_\_\_ hereby  
Print Name

acknowledge and agree that \_\_\_\_\_ will  
General Permit Applicant's Name

construct an emission unit(s) at a natural gas production facility  
that will be located within 300' of my dwelling and/or business.

I hereby offer this waiver of siting criteria to the West Virginia Department of Environmental Protection  
Division of Air Quality as permission to construct, install and operate in such location.

Signed:

---

Signature

---

Date

---

Signature

---

Date

**Taken, subscribed and sworn before me this \_\_\_\_\_ day of**

\_\_\_\_\_, 20\_\_\_\_\_.  

---

My commission expires: \_\_\_\_\_

SEAL \_\_\_\_\_  
Notary Public

**ATTACHMENT C**

**Business Certificate**

State of West Virginia



Certificate

*I, Natalie E. Tennant, Secretary of State of the  
State of West Virginia, hereby certify that*

CNX GAS COMPANY LLC

was duly authorized under the laws of this state to transact business in West Virginia as a foreign limited liability company on June 29, 2001.

The company is filed as a term company, for the term ending June 29, 2026.

I further certify that the company's most recent annual report, as required by West Virginia Code §31B-2-211, has been filed with our office and that a certificate of cancellation has not been filed.

Therefore, I hereby issue this

**CERTIFICATE OF AUTHORIZATION**



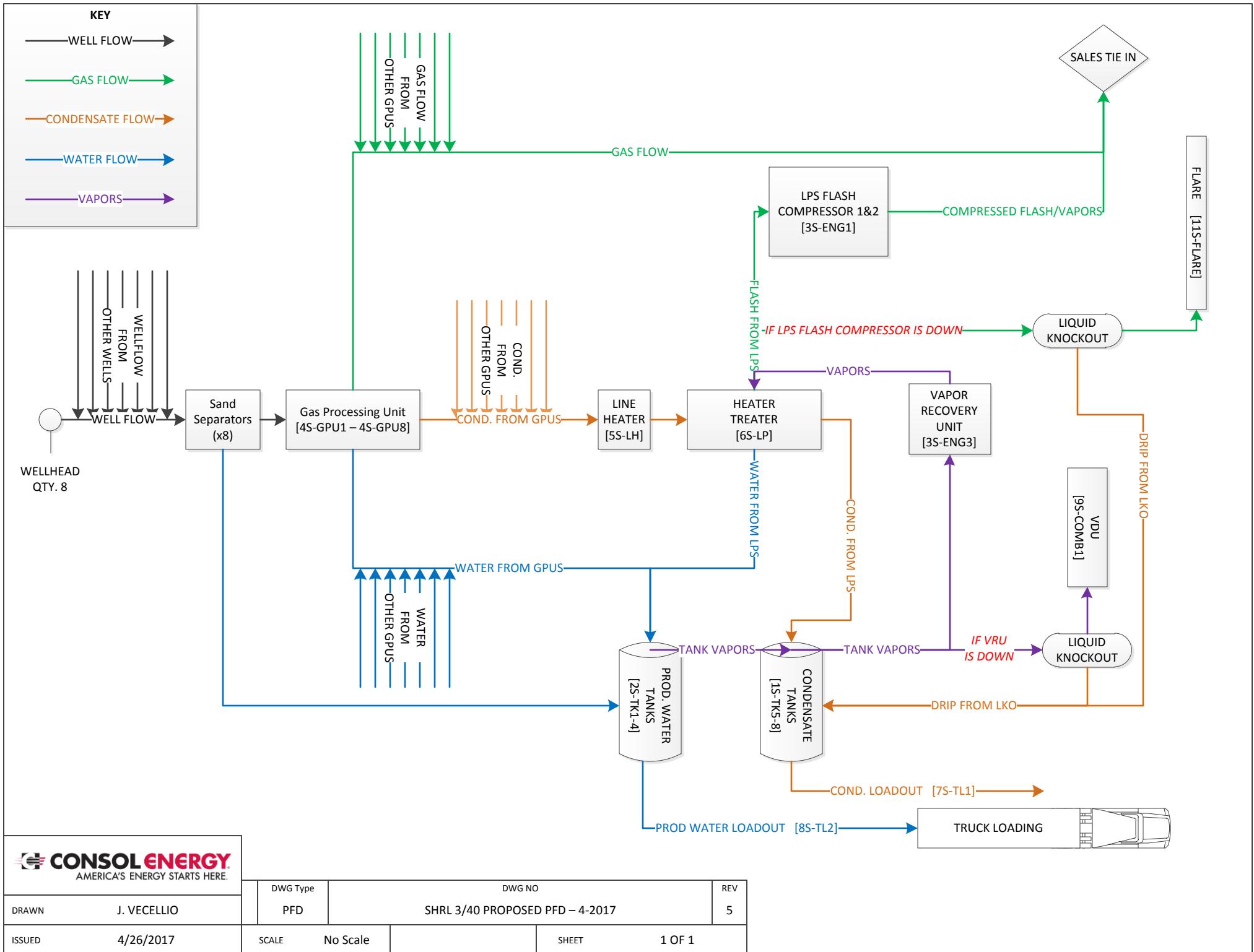
*Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
October 28, 2011*

  
*Natalie E. Tennant*

*Secretary of State*

**ATTACHMENT D**

**Process Flow Diagram**



**ATTACHMENT E**

**Process Description**

## **ATTACHMENT E: PROCESS DESCRIPTION**

The Shirley 3/40 wellpad (SHR 3/40) is a natural gas production facility that consists of two wellpads – Shirley 3 and Shirley 40. Each pad consists of four (4) wells-Total of eight (8) wells at the SHR 3/40.

Incoming gas/liquid stream from the underground wells will pass through the gas production units (4S-GPU 1-8) which will raise/maintain temperature and then pass through the high pressure (3 phase) separators, which will separate gas (natural gas from the separator is sent to the sales line) from liquids (condensate and produced water). The produced water from the separator is transferred to the produced water storage tanks (2S-TK1-4).

The condensate fluids stream will then pass through the line heater (5S-LH) and heater treater, where it is heated (6S-HT) to volatilize (flash off) lighter hydrocarbons and separate condensate in the liquid stream. The flash gas from the low pressure separator is recovered by flash gas compressors, which utilizes natural gas fired compressor engines (3S-ENG1-2) to raise the pressure of the flash gas and then route it back to the sales line. During VRU downtime, the flash gas from the heater treater will be routed to a liquid knock out vessel, which separates additional produced fluids from the flash gas, and then sent to the flare (11S-FLARE) for destruction. The condensate from the heater treater is then transferred to the condensate storage tanks (1S-TK5-8).

Working, breathing and flash emissions from the condensate and produced water storage tanks are controlled by the vapor recovery unit, which is powered by a natural gas fired engine (3S-ENG3). When the VRU is inoperative, vapors from the storage vessels are routed to vapor combustor unit (9S-COMB1) for emissions control. Condensate and produced water are transported off-site via tanker truck (7S-TL1 and 8S-TL2).

A process flow diagram is included as Attachment D.

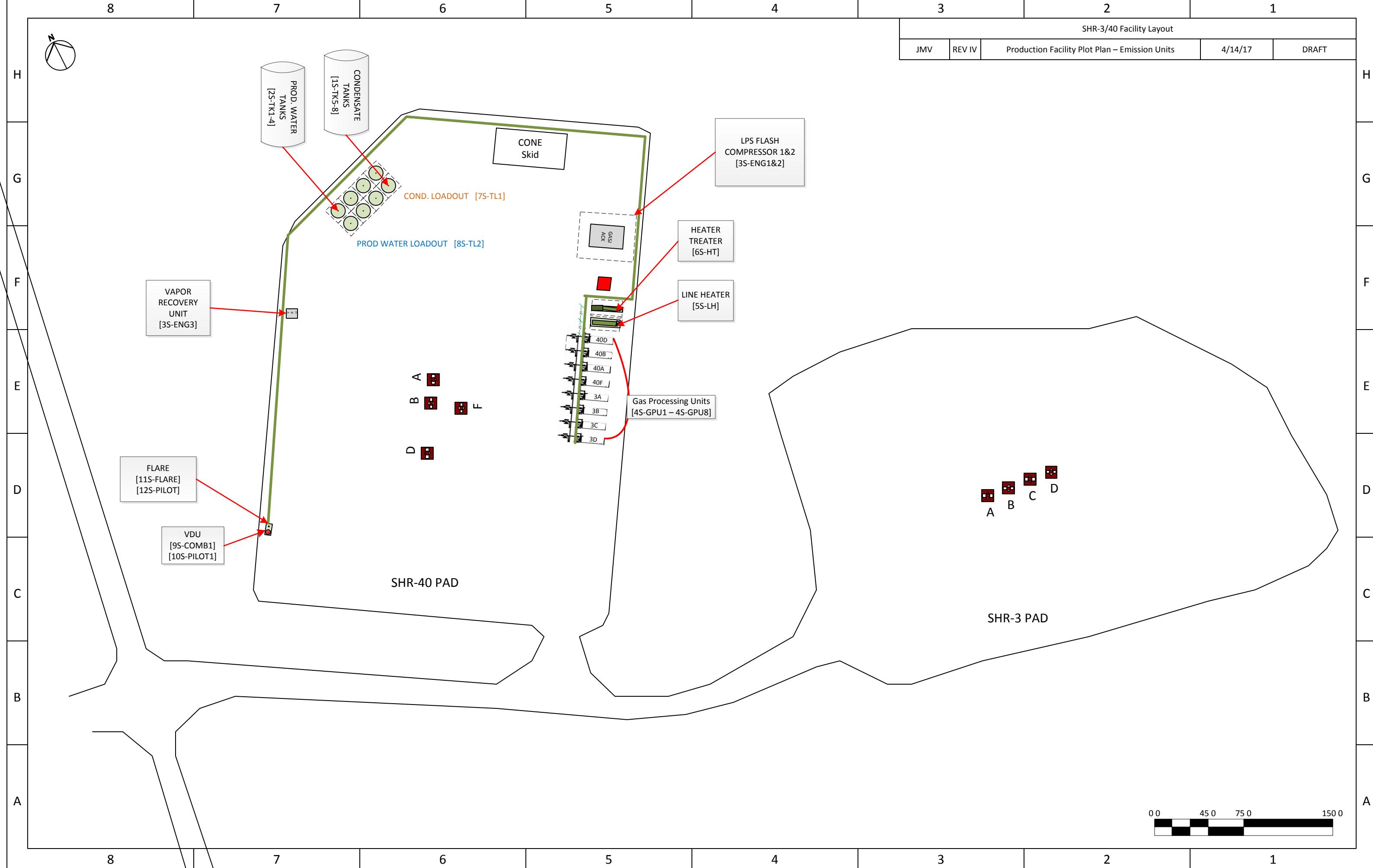
**ATTACHMENT F**

**Plot Plan**

8 7 6 5 4 3 2 1

SHR-3/40 Facility Layout

JMV REV IV Production Facility Plot Plan – Emission Units 4/14/17 DRAFT



**ATTACHMENT G**

**Area Map**

## ATTACHMENT G: AREA MAP



Figure 1 - Map of SHR 3/40 Station Location

Zone: 17  
UTM Northing (KM): 4362.744  
UTM Easting (KM): 514.273  
Elevation (ft): ~765

**ATTACHMENT H**

**G70-D Section Applicability Form**

## ATTACHMENT H – G70-D SECTION APPLICABILITY FORM

### **General Permit G70-D Registration Section Applicability Form**

General Permit G70-D was developed to allow qualified applicants to seek registration for a variety of sources. These sources include gas well affected facilities, storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, pneumatic pumps, reciprocating internal combustion engines (RICEs), tank truck/rail car loading, fugitive emissions, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

General Permit G70-D allows the registrant to choose which sections of the permit they are seeking registration under. Therefore, please mark which additional sections that you are applying for registration under. If the applicant is seeking registration under multiple sections, please select all that apply. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

<b>GENERAL PERMIT G70-D APPLICABLE SECTIONS</b>	
<input checked="" type="checkbox"/> Section 5.0	Gas and Oil Well Affected Facility (NSPS, Subpart OOOO/OOOOa)
<input checked="" type="checkbox"/> Section 6.0	Storage Vessels Containing Condensate and/or Produced Water <sup>1</sup>
<input type="checkbox"/> Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
<input checked="" type="checkbox"/> Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
<input checked="" type="checkbox"/> Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
<input type="checkbox"/> Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)
<input type="checkbox"/> Section 11.0	Pneumatic Pump Affected Facility (NSPS, Subpart OOOOa)
<input checked="" type="checkbox"/> Section 12.0	Fugitive Emissions GHG and VOC Standards (NSPS, Subpart OOOOa)
<input checked="" type="checkbox"/> Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines
<input checked="" type="checkbox"/> Section 14.0	Tanker Truck/Rail Car Loading <sup>2</sup>
<input type="checkbox"/> Section 15.0	Glycol Dehydration Units <sup>3</sup>

<sup>1</sup> Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subparts OOOO or OOOOa control requirements or the applicable control device requirements of Section 8.

<sup>2</sup> Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.

<sup>3</sup> Applicants that are subject to Section 15 may also be subject to the requirements of Section 9 (reboilers). Applicants that are subject to Section 15 may also be subject to control device and emission reduction device requirements of Section 8.

**ATTACHMENT I**

**Emission Units Table**

## **ATTACHMENT I – EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE**

Include ALL emission units and air pollution control devices/ERDs that will be part of this permit application review. Do not include fugitive emission sources in this table. Deminimis storage tanks shall be listed in the Attachment L table. This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

<b>Emission Unit ID<sup>1</sup></b>	<b>Emission Point ID<sup>2</sup></b>	<b>Emission Unit Description</b>	<b>Year Installed</b>	<b>Manufac. Date<sup>3</sup></b>	<b>Design Capacity</b>	<b>Type<sup>4</sup> and Date of Change</b>	<b>Control Device(s)<sup>5</sup></b>	<b>ERD(s)<sup>6</sup></b>
1S-TK5 to 1S-TK8	3S-ENG3/9E-COMB1	Four (4) Condensate Storage Tanks	TBD		400 bbl (each)	New	3S-ENG3/9E-COMB1	---
2S-TK1 to 2S-TK4	3S-ENG3/9E-COMB1	Four (4) Produced Water Storage Tanks	TBD		400 bbl (each)	New	3S-ENG3/9E-COMB1	---
3S-ENG1	3E-ENG1	Gas Jack GJ320 Compressor Engine	TBD		46 hp	New	None	---
3S-ENG2	3E-ENG2	Gas Jack GJ320 Compressor Engine	TBD		46 hp	New	None	---
3S-ENG3	3E-ENG3	Gas Jack GJ320	TBD		46 hp	New	None	---
4S-GPU1-4GPU8	4E-GPU1 – 4E-GPU8	Eight (8) Gas Processing Units	TBD		1.0 MMBtu/hr	New	None	---
5S-LH	5E-LH	Line Heater	TBD		1.5 MMBtu/hr	New	None	---
6S-LP	6E-LP	LP Separator Heater	TBD		1.0 MMBtu/hr	New	None	---
7S-TL1	9E-COMB1	Condensate Truck Loading	TBD		7,665,000 gal/yr	New	None	---
8S-TL2	9E-COMB1	Produced Water Truck Loading	TBD		15,330,000 gal/yr	New	None	---
9S-COMB1	9E-COMB1	Vapor Combustor Unit	TBD		8.69 MMBtu/hr	New	None	---
10S-PILOT	10E-PILOT	Vapor Combustor Pilot	TBD		40 scfh	New	N/A	---
11S-FLARE	11E-FLARE	Flare	TBD		26.2 MMBtu/hr	New	N/A	---
12S-PILOT	12E-PILOT	Flare Pilot	TBD		60 scfh	New	N/A	---

<sup>1</sup> For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S,... or other appropriate designation.

<sup>2</sup> For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

<sup>3</sup>

When required by rule

<sup>4</sup> New, modification, removal, existing

<sup>5</sup> For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

<sup>6</sup> For ERDs use the following numbering system: 1D, 2D, 3D,... or other appropriate designation.

**ATTACHMENT J**

**Fugitive Emissions Summary Sheet**

## ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

Sources of fugitive emissions may include loading operations, equipment leaks, blowdown emissions, etc.  
Use extra pages for each associated source or equipment if necessary.

Source/Equipment: Fugitive Emissions								
Leak Detection Method Used		<input type="checkbox"/> Audible, visual, and olfactory (AVO) inspections <input type="checkbox"/> Infrared (FLIR) cameras		<input checked="" type="checkbox"/> Other (please describe) Will satisfy condition 12.1.1 of the G70-D		<input type="checkbox"/> None required		
Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))		Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
						VOC	HAP	GHG (methane, CO <sub>2</sub> e)
Pumps	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	12	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).		<input type="checkbox"/> Gas <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Both	3.7E-03	1.3E-04	0.44
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	479	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).		<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	3.48	0.12	47.01
Safety Relief Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	30	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).		<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.42	0.01	4.29
Open Ended Lines	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	33	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).		<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Both	0.11	3.6E-03	7.33
Sampling Connections	<input type="checkbox"/> Yes <input type="checkbox"/> No		N/A		<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	---	---	---
Connections (Not sampling)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2,126	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).		<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Both	0.69	0.02	23.20
Compressors	<input type="checkbox"/> Yes <input type="checkbox"/> No		N/A		<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	---	---	---
Flanges	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1,063	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).		<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.67	0.02	116.02
Other <sup>1</sup>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	40	40 CFR 98 Subpart W		<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	7.14	0.24	655.02

<sup>1</sup> Other equipment types may include compressor seals, relief valves, diaphragms, drains, meters, etc.

Please provide an explanation of the sources of fugitive emissions (e.g. pigging operations, equipment blowdowns, pneumatic controllers, etc.):

Pneumatic Controller count is ‘Other’ category. An estimate of Miscellaneous Gas Venting emissions are included in the Emission Calculations and serve to include such sources as compressor venting, pigging, vessel blowdowns and other sources.

Please indicate if there are any closed vent bypasses (include component): N/A

Specify all equipment used in the closed vent system (e.g. VRU, ERD, thief hatches, tanker truck/rail car loading, etc.) N/A

**ATTACHMENT K**

**Gas Well Data Sheet**

## **ATTACHMENT K – GAS WELL AFFECTED FACILITY DATA SHEET**

Complete this data sheet if you are the owner or operator of a gas well affected facility for which construction, modification or reconstruction commenced after August 23, 2011. This form must be completed for natural gas well affected facilities regardless of when flowback operations occur (or have occurred).

<b>API Number</b>	<b>Date of Flowback</b>	<b>Date of Well Completion</b>	<b>Green Completion and/or Combustion Device</b>	<b>Subject to OOOO or OOOOa?</b>
047-095-02193	TBD	TBD	Green Completion	0000a
047-095-02124	TBD	TBD	Green Completion	0000a
047-095-02194	TBD	TBD	Green Completion	0000a
047-095-02195	TBD	TBD	Green Completion	0000a
047-095-02206	TBD	TBD	Green Completion	0000a
047-095-02204	TBD	TBD	Green Completion	0000a
047-095-02212	TBD	TBD	Green Completion	0000a
047-095-02214	TBD	TBD	Green Completion	0000a

*Note: If future wells are planned and no API number is available please list as PLANNED.  
If there are existing wells that commenced construction prior to August 23, 2011, please acknowledge as existing.*

*This is the same API (American Petroleum Institute) well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number may be provided on the application without the state code (047).*

*Every oil and gas well permitted in West Virginia since 1929 has been issued an API number. This API is used by agencies to identify and track oil and gas wells.*

*The API number has the following format: 047-001-00001*

*Where,*

*047 = State code. The state code for WV is 047.  
001 = County Code. County codes are odd numbers, beginning with 001  
(Barbour) and continuing to 109 (Wyoming).  
00001= Well number. Each well will have a unique well number.*

**ATTACHMENT L**

**Storage Vessel Data Sheet**

## ATTACHMENT L – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for **each** new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water. (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.**

**The following information is REQUIRED:**

- Composition of the representative sample used for the simulation
- For each stream that contributes to flashing emissions:
  - Temperature and pressure (inlet and outlet from separator(s))
  - Simulation-predicted composition
  - Molecular weight
  - Flow rate
- Resulting flash emission factor or flashing emissions from simulation
- Working/breathing loss emissions from tanks and/or loading emissions if simulation is used to quantify those emissions

*Additional information may be requested if necessary.*

**GENERAL INFORMATION (REQUIRED)**

1. Bulk Storage Area Name SHR 3/40	2. Tank Name Condensate Tanks
3. Emission Unit ID number 1S-TK5 to 1S-TK8	4. Emission Point ID number 3S-ENG3/9E-COMB1
5. Date Installed , Modified or Relocated ( <i>for existing tanks</i> ) Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Type of change: <input checked="" type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other <input type="checkbox"/> Relocation
Was the tank manufactured after September 18, 2015? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
7A. Description of Tank Modification ( <i>if applicable</i> ) N/A	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<i>If Yes, please provide the appropriate documentation and items 8-42 below are not required.</i>	

## TANK INFORMATION

8. Design Capacity ( <i>specify barrels or gallons</i> ). Use the internal cross-sectional area multiplied by internal height. 400 bbls	
9A. Tank Internal Diameter (ft.) 12	9B. Tank Internal Height (ft.) 20
10A. Maximum Liquid Height (ft.) 20	10B. Average Liquid Height (ft.) 10
11A. Maximum Vapor Space Height (ft.) 20	11B. Average Vapor Space Height (ft.) 10
12. Nominal Capacity ( <i>specify barrels or gallons</i> ). This is also known as "working volume". 400 bbls	
13A. Maximum annual throughput (gal/yr) See attached emissions calculations for all throughput values	13B. Maximum daily throughput (gal/day) See attached emissions calculations for all throughput values
14. Number of tank turnovers per year See attached emissions calculations for all throughput values	15. Maximum tank fill rate (gal/min) See attached emissions calculations for all throughput values
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply):	
<input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input checked="" type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe)	
<input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof	
<input type="checkbox"/> Domed External (or Covered) Floating Roof	
<input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting	
<input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm	
<input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical	
<input type="checkbox"/> Other (describe)	

## PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:	
<input type="checkbox"/> Does Not Apply	<input type="checkbox"/> Rupture Disc (psig)
<input type="checkbox"/> Inert Gas Blanket of _____	<input type="checkbox"/> Carbon Adsorption <sup>1</sup>
<input checked="" type="checkbox"/> Vent to Vapor Combustion Device <sup>1</sup> (vapor combustors, flares, thermal oxidizers, enclosed combustors)	
<input checked="" type="checkbox"/> Conservation Vent (psig)	<input type="checkbox"/> Condenser <sup>1</sup>
-0.03 Vacuum Setting	0.03 Pressure Setting
<input type="checkbox"/> Emergency Relief Valve (psig)	
Vacuum Setting	Pressure Setting
<input type="checkbox"/> Thief Hatch Weighted <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<sup>1</sup> Complete appropriate Air Pollution Control Device Sheet	

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).									
Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method <sup>1</sup>
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
<b>See attached Emissions Calculation for all values</b>									

<sup>1</sup> EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)  
Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction:			
<input checked="" type="checkbox"/> Riveted <input type="checkbox"/> Gunite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)			
21A. Shell Color: Tnemec Green	21B. Roof Color: Tnemec Green	21C. Year Last Painted: New	
22. Shell Condition (if metal and unlined):			
<input type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input checked="" type="checkbox"/> Not applicable			
22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): <b>Must be listed for tanks using VRUs with closed vent system.</b>			
24. Is the tank a <b>Vertical Fixed Roof Tank</b> ? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slope (ft/ft): 0.06	
25. Complete item 25 for <b>Floating Roof Tanks</b> <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type (check one): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25D. If yes, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):			
25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25F. Describe deck fittings:			
26. Complete the following section for <b>Internal Floating Roof Tanks</b> <input checked="" type="checkbox"/> Does not apply			
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	26B. For bolted decks, provide deck construction:		
26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft <sup>2</sup> ):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
28. Closed Vent System with Enclosed Combustor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
<b>SITE INFORMATION - Not Applicable: Tank calculations performed using ProMax software</b>			
29. Provide the city and state on which the data in this section are based:			
30. Daily Avg. Ambient Temperature (°F):	31. Annual Avg. Maximum Temperature (°F):		
32. Annual Avg. Minimum Temperature (°F):	33. Avg. Wind Speed (mph):		
34. Annual Avg. Solar Insulation Factor (BTU/ft <sup>2</sup> -day):	35. Atmospheric Pressure (psia):		
<b>LIQUID INFORMATION - Not Applicable: Tank calculations performed using ProMax software</b>			
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):	
37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):	
38A. Minimum liquid surface temperature (°F):		38B. Corresponding vapor pressure (psia):	
39A. Avg. liquid surface temperature (°F):		39B. Corresponding vapor pressure (psia):	
40A. Maximum liquid surface temperature (°F):		40B. Corresponding vapor pressure (psia):	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: _____ To: _____			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

## GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name SHR 3/40	2. Tank Name Produced Water Tanks
3. Emission Unit ID number 2S-TK1 to 2S-TK4	4. Emission Point ID number 3S-ENG3/9E-COMB1
5. Date Installed , Modified or Relocated ( <i>for existing tanks</i> ) Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Was the tank manufactured after September 18, 2015? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
6. Type of change: <input type="checkbox"/> New construction <input type="checkbox"/> New stored material <input checked="" type="checkbox"/> Other (no change) <input type="checkbox"/> Relocation	
7A. Description of Tank Modification ( <i>if applicable</i> ) N/A	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<i>If Yes, please provide the appropriate documentation and items 8-42 below are not required.</i>	

## TANK INFORMATION

8. Design Capacity ( <i>specify barrels or gallons</i> ). Use the internal cross-sectional area multiplied by internal height. 400 bbls	
9A. Tank Internal Diameter (ft.) 12	9B. Tank Internal Height (ft.) 20
10A. Maximum Liquid Height (ft.) 20	10B. Average Liquid Height (ft.) 10
11A. Maximum Vapor Space Height (ft.) 20	11B. Average Vapor Space Height (ft.) 10
12. Nominal Capacity ( <i>specify barrels or gallons</i> ). This is also known as "working volume". 400 bbls	
13A. Maximum annual throughput (gal/yr) See attached emissions calculations for all throughput values	13B. Maximum daily throughput (gal/day) See attached emissions calculations for all throughput values
14. Number of tank turnovers per year See attached emissions calculations for all throughput values	15. Maximum tank fill rate (gal/min) See attached emissions calculations for all throughput values
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input checked="" type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe)  <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Other (describe)	

## PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:	
<input type="checkbox"/> Does Not Apply	<input type="checkbox"/> Rupture Disc (psig)
<input type="checkbox"/> Inert Gas Blanket of _____	<input type="checkbox"/> Carbon Adsorption <sup>1</sup>
<input checked="" type="checkbox"/> Vent to Vapor Combustion Device <sup>1</sup> (vapor combustors, flares, thermal oxidizers, enclosed combustors)	
<input checked="" type="checkbox"/> Conservation Vent (psig) -0.03 psig Vacuum Setting	<input type="checkbox"/> Condenser <sup>1</sup> 1 psig Pressure Setting
<input type="checkbox"/> Emergency Relief Valve (psig)	

Vacuum Setting		Pressure Setting						
<input type="checkbox"/> Thief Hatch Weighted		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
1 Complete appropriate Air Pollution Control Device Sheet								
20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).								
Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss	Estimation Method <sup>1</sup>
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy		
See attached Emissions Calculation for all values								

<sup>1</sup> EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

TANK CONSTRUCTION AND OPERATION INFORMATION							
21. Tank Shell Construction:							
<input checked="" type="checkbox"/> Riveted <input type="checkbox"/> Gunite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)							
21A. Shell Color: Tnemec Green		21B. Roof Color: Tnemec Green		21C. Year Last Painted: New			
22. Shell Condition (if metal and unlined):							
<input type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input checked="" type="checkbox"/> Not applicable							
22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		22B. If yes, operating temperature:		22C. If yes, how is heat provided to tank?			
23. Operating Pressure Range (psig):							
<b>Must be listed for tanks using VRUs with closed vent system.</b>							
24. Is the tank a <b>Vertical Fixed Roof Tank</b> ? <input checked="" type="checkbox"/>		24A. If yes, for dome roof provide radius (ft):		24B. If yes, for cone roof, provide slop (ft/ft): 0.06			
25. Complete item 25 for <b>Floating Roof Tanks</b> <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>							
25A. Year Internal Floater Installed:							
25B. Primary Seal Type (check one): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe):							
25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No							
25D. If yes, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):							
25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No							
25F. Describe deck fittings:							
26. Complete the following section for <b>Internal Floating Roof Tanks</b> <input checked="" type="checkbox"/> Does not apply							
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded		26B. For bolted decks, provide deck construction:					
26C. Deck seam. Continuous sheet construction:							
<input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe)							
26D. Deck seam length (ft.):		26E. Area of deck (ft <sup>2</sup> ):		26F. For column supported tanks, # of columns:		26G. For column supported tanks, diameter of column:	
27. Closed Vent System with VRU? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							
28. Closed Vent System with Enclosed Combustor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							
<b>SITE INFORMATION - Not Applicable: Tank calculations performed using ProMax software</b>							
29. Provide the city and state on which the data in this section are based:							
30. Daily Avg. Ambient Temperature (°F):		31. Annual Avg. Maximum Temperature (°F):					
32. Annual Avg. Minimum Temperature (°F):		33. Avg. Wind Speed (mph):					

34. Annual Avg. Solar Insulation Factor (BTU/ft <sup>2</sup> -day):	35. Atmospheric Pressure (psia):	
<b>LIQUID INFORMATION - Not Applicable: Tank calculations performed using ProMax software</b>		
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):
37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):
38A. Minimum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):	
39A. Avg. liquid surface temperature (°F):	39B. Corresponding vapor pressure (psia):	
40A. Maximum liquid surface temperature (°F):	40B. Corresponding vapor pressure (psia):	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.		
41A. Material name and composition:		
41B. CAS number:		
41C. Liquid density (lb/gal):		
41D. Liquid molecular weight (lb/lb-mole):		
41E. Vapor molecular weight (lb/lb-mole):		
41F. Maximum true vapor pressure (psia):		
41G. Maximum Reid vapor pressure (psia):		
41H. Months Storage per year. From: _____ To: _____		
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.		

**STORAGE TANK DATA TABLE**  
**List all deminimis storage tanks (i.e. lube oil, glycol, diesel etc.)**

Source ID # <sup>1</sup>	Status <sup>2</sup>	Content <sup>3</sup>	Volume <sup>4</sup>

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the well site. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:  
EXIST Existing Equipment  
NEW Installation of New Equipment  
REM Equipment Removed
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, diesel, mercaptan etc.
4. Enter the maximum design storage tank volume in gallons.

**ATTACHMENT M**

**Heaters Data Sheet**

**ATTACHMENT M – SMALL HEATERS AND REBOILERS NOT SUBJECT TO 40CFR60**  
**SUBPART DC**  
**DATA SHEET**

Complete this data sheet for each small heater and reboiler not subject to 40CFR60 Subpart Dc at the facility. ***The Maximum Design Heat Input (MDHI) must be less than 10 MMBTU/hr.***

Emission Unit ID <sup>1</sup>	Emission Point ID <sup>2</sup>	Emission Unit Description (manufacturer, model #)	Year Installed/Modified	Type <sup>3</sup> and Date of Change	Maximum Design Heat Input (MMBTU/hr) <sup>4</sup>	Fuel Heating Value (BTU/scf) <sup>5</sup>
4S-GPU1	4E-GPU1	Gas Processing Unit	TBD	New	1.0	~1,249
4S-GPU2	4E-GPU2	Gas Processing Unit	TBD	New	1.0	~1,249
4S-GPU3	4E-GPU3	Gas Processing Unit	TBD	New	1.0	~1,249
4S-GPU4	4E-GPU4	Gas Processing Unit	TBD	New	1.0	~1,249
4S-GPU5	4E-GPU5	Gas Processing Unit	TBD	New	1.0	~1,249
4S-GPU6	4E-GPU6	Gas Processing Unit	TBD	New	1.0	~1,249
4S-GPU7	4E-GPU7	Gas Processing Unit	TBD	New	1.0	~1,249
4S-GPU8	4E-GPU8	Gas Processing Unit	TBD	New	1.0	~1,249
5S-LH	5E-LH	Line Heater	TBD	New	1.5	~1,249
6S-LP	6E-LP	Heater Treater Heater	TBD	New	1.0	~1,249

<sup>1</sup> Enter the appropriate Emission Unit (or Source) identification number for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S...or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the Glycol Dehydration Unit Data Sheet.

<sup>2</sup> Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For emission points, use 1E, 2E, 3E...or other appropriate designation.

<sup>3</sup> New, modification, removal

<sup>4</sup> Enter design heat input capacity in MMBtu/hr.

<sup>5</sup> Enter the fuel heating value in BTU/standard cubic foot

**ATTACHMENT N**

**Engines Data Sheet**

## ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET

Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

Emission Unit ID <sup>1</sup>	3S-ENG1		3S-ENG2		3S-ENG3		
Engine Manufacturer/Model	Gas Jack GJ230		Gas Jack GJ230		Gas Jack GJ230		
Manufacturers Rated bhp/rpm	46 @ 1,000 rpm		46 @ 1,000 rpm		46 @ 1,000 rpm		
Source Status <sup>2</sup>	NS		NS		NS		
Date Installed/ Modified/Removed/Relocated <sup>3</sup>	July/August 2017		July/August 2017		July/August 2017		
Engine Manufactured /Reconstruction Date <sup>4</sup>	TBD		TBD		TBD		
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable) <sup>5</sup>	<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input checked="" type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHP ZZZZ Remote Sources		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input checked="" type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHP ZZZZ Remote Sources		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input checked="" type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHP ZZZZ Remote Sources		
Engine Type <sup>6</sup>	4SRB		4SRB		4SRB		
APCD Type <sup>7</sup>	A/F		A/F		A/F		
Fuel Type <sup>8</sup>	NG		NG		NG		
H <sub>2</sub> S (gr/100 scf)	0.0		0.0		0.0		
Operating bhp/rpm	46 @ 1,000 rpm		46 @ 1,000 rpm		46 @ 1,000 rpm		
BSFC (BTU/bhp-hr)	10,777		10,777		10,777		
Hourly Fuel Throughput	397	ft <sup>3</sup> /hr gal/hr	397	ft <sup>3</sup> /hr gal/hr	397	ft <sup>3</sup> /hr gal/hr	
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	3.5	MMft <sup>3</sup> /yr gal/yr	3.5	MMft <sup>3</sup> /yr gal/yr	3.5	MMft <sup>3</sup> /yr gal/yr	
Fuel Usage or Hours of Operation Metered	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
	Pollutant <sup>10</sup>	Hourly PTE (lb/hr) <sup>11</sup>	Annual PTE (tons/year) <sup>11</sup>	Hourly PTE (lb/hr) <sup>11</sup>	Annual PTE (tons/year) <sup>11</sup>	Hourly PTE (lb/hr) <sup>11</sup>	Annual PTE (tons/year) <sup>11</sup>
MD	NO <sub>x</sub>	0.20	0.89	0.20	0.89	0.20	0.89
MD	CO	0.41	1.78	0.41	1.78	0.41	1.78
MD	VOC	0.11	0.49	0.11	0.49	0.11	0.49
AP-42	SO <sub>2</sub>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AP-42	PM <sub>10</sub>	0.01	0.04	0.01	0.04	0.01	0.04
AP-42	Formaldehyde	0.01	0.04	0.01	0.04	0.01	0.04
AP-42	Total HAPs	0.02	<0.07	0.02	<0.07	0.02	<0.07
40 CFR 98, Table C-2	GHG (CO <sub>2</sub> e)	52	229	52	229	52	229

1 Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion engine/generator engine located at the well site. Multiple engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. Microturbine generator engines should be designated MT-1, MT-2, MT-3 etc. If more than three (3) engines exist, please use additional sheets.

2 Enter the Source Status using the following codes:

NS	Construction of New Source (installation)	ES	Existing Source
MS	Modification of Existing Source	RS	Relocated Source
REM	Removal of Source		

- 3 Enter the date (or anticipated date) of the engine's installation (construction of source), modification, relocation or removal.
- 4 Enter the date that the engine was manufactured, modified or reconstructed.
- 5 Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart IIII/JJJ? If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance as appropriate.

**Provide a manufacturer's data sheet for all engines being registered.**

- 6 Enter the Engine Type designation(s) using the following codes:

2SLB	Two Stroke Lean Burn	4SRB	Four Stroke Rich Burn
4SLB	Four Stroke Lean Burn		

- 7 Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

A/F	Air/Fuel Ratio	IR	Ignition Retard
HEIS	High Energy Ignition System	SIPC	Screw-in Precombustion Chambers
PSC	Prestratified Charge	LEC	Low Emission Combustion
NSCR	Rich Burn & Non-Selective Catalytic Reduction	OxCat	Oxidation Catalyst
SCR	Lean Burn & Selective Catalytic Reduction		

- 8 Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas /Production Gas	D	Diesel
----	------------------------------	----	---------------------------------	---	--------

- 9 Enter the Potential Emissions Data Reference designation using the following codes. Attach all reference data used.

MD	Manufacturer's Data	AP	AP-42
GR	GRI-HAPCalc™	OT	Other

(please list)

- 10 Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet*.
- 11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

**Engine Air Pollution Control Device  
(Emission Unit ID#, use extra pages as necessary)**

Air Pollution Control Device Manufacturer's Data Sheet included?  
Yes  No

NSCR

SCR

Oxidation Catalyst

Provide details of process control used for proper mixing/control of reducing agent with gas stream: Sequential multi-part fuel injection

Manufacturer:	Model:
Design Operating Temperature:	Design gas volume: scfm
Service life of catalyst:	Provide manufacturer data? <input type="checkbox"/> Yes <input type="checkbox"/> No
Volume of gas handled:	Operating temperature range for NSCR/Ox Cat: From                      °F to                      °F
Reducing agent used, if any:	Ammonia slip (ppm):

Pressure drop against catalyst bed (delta P):

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

Is temperature and pressure drop of catalyst required to be monitored per 40CFR63 Subpart ZZZZ?

Yes  No

How often is catalyst recommended or required to be replaced (hours of operation)?

How often is performance test required?

- Initial
- Annual
- Every 8,760 hours of operation
- Field Testing Required
- No performance test required. If so, why (please list any maintenance required and the applicable sections in NSPS/GACT,

**ATTACHMENT O**

**Truck Loading Data Sheet**

## **ATTACHMENT O – TANKER TRUCK/RAIL CAR LOADING DATA SHEET**

Complete this data sheet for each new or modified bulk liquid transfer area or loading rack at the facility. This is to be used for bulk liquid transfer operations to tanker trucks/rail cars. Use extra pages if necessary.

### ***Truck/Rail Car Loadout Collection Efficiencies***

The following applicable capture efficiencies of a truck/rail car loadout are allowed:

- For tanker trucks/rail cars passing the MACT level annual leak test – 99.2%
- For tanker trucks/rail cars passing the NSPS level annual leak test – 98.7%
- For tanker trucks/rail cars not passing one of the annual leak tests listed above – 70%

Compliance with this requirement shall be demonstrated by keeping records of the applicable MACT or NSPS Annual Leak Test certification for **every** truck and railcar loaded/unloaded. This requirement can be satisfied if the trucking/rail car company provided certification that its entire fleet was compliant. This certification must be submitted in writing to the Director of the DAQ. These additional requirements must be noted in the Registration Application.

Emission Unit ID#: 7S-TL1 and 8S-TL2	Emission Point ID#: 9E-COMB1	Year Installed/Modified: TBD		
Emission Unit Description: Uncaptured losses from loading of produced and condensate fluids into tanker trucks				
<b>Loading Area Data</b>				
Number of Pumps:	Number of Liquids Loaded: 2	Max number of trucks/rail cars loading at one (1) time: 2		
Are tanker trucks/rail cars pressure tested for leaks at this or any other location? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required If Yes, Please describe: Tanker trucks are required to be DOT pressure tested.				
Provide description of closed vent system and any bypasses. Trucks utilize vapor recovery lines to route displaced vapors back into battery of tanks.				
Are any of the following truck/rail car loadout systems utilized? <input type="checkbox"/> Closed System to tanker truck/rail car passing a MACT level annual leak test? <input type="checkbox"/> Closed System to tanker truck/rail car passing a NSPS level annual leak test? <input checked="" type="checkbox"/> Closed System to tanker truck/rail car not passing an annual leak test and has vapor return?				
<b>Projected Maximum Operating Schedule (for rack or transfer point as a whole)</b>				
Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	24	24	24	24
Days/week	7	7	7	7
<b>Bulk Liquid Data (use extra pages as necessary)</b>				
Liquid Name	Condensate	Produced Water		
Max. Daily Throughput (1000 gal/day)	See attached emissions calculations for all throughput values	See attached emissions calculations for all throughput values		
Max. Annual Throughput (1000 gal/yr)	See attached emissions calculations for all throughput values	See attached emissions calculations for all throughput values		
Loading Method <sup>1</sup>	SUB	SUB		
Max. Fill Rate (gal/min)	Varies	Varies		
Average Fill Time (min/loading)	Varies	Varies		
Max. Bulk Liquid Temperature (°F)	See ProMax results	See ProMax results		
True Vapor Pressure <sup>2</sup>	See ProMax results	See ProMax results		
Cargo Vessel Condition <sup>3</sup>	U	U		

Control Equipment or Method <sup>4</sup>		VB, ECD (captured loading losses)	VB, ECD (captured loading losses)	
Max. Collection Efficiency (%)		70	70	
Max. Control Efficiency (%)		98	98	
Max.VOC Emission Rate	Loading (lb/hr)	See attached emission calculations for breakdown	See attached emission calculations for breakdown	
	Annual (ton/yr)	See attached emission calculations for breakdown	See attached emission calculations for breakdown	
Max.HAP Emission Rate	Loading (lb/hr)	See attached emission calculations for breakdown	See attached emission calculations for breakdown	
	Annual (ton/yr)	See attached emission calculations for breakdown	See attached emission calculations for breakdown	
Estimation Method <sup>5</sup>		AP-42 Section 5.2 Methodology (via ProMax)	AP-42 Section 5.2 Methodology (via ProMax)	

- 1 BF Bottom Fill SP Splash Fill SUB Submerged Fill  
 2 At maximum bulk liquid temperature  
 3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)  
 O Other (describe)  
 4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)  
 CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)  
 ECD Enclosed Combustion Device F Flare  
 TO Thermal Oxidization or Incineration  
 5 EPA EPA Emission Factor in AP-42 MB Material Balance  
 TM Test Measurement based upon test data submittal O Other (describe)

**ATTACHMENT P**

**Glycol Dehydrator Data Sheet (*Not Applicable*)**

## ATTACHMENT P – GLYCOL DEHYDRATION UNIT DATA SHEET - NOT APPLICABLE

Complete this data sheet for each Glycol Dehydration Unit, Reboiler, Flash Tank and/or Regenerator at the facility. Include gas sample analysis and GRI- GLYCalc™ input and aggregate report. Use extra pages if necessary.

Manufacturer:		Model:	
Max. Dry Gas Flow Rate: mmscf/day		Reboiler Design Heat Input: MMBTU/hr	
Design Type: <input type="checkbox"/> TEG <input type="checkbox"/> DEG <input type="checkbox"/> EG		Source Status <sup>1</sup> :	
Date Installed/Modified/Removed <sup>2</sup> :		Regenerator Still Vent APCD/ERD <sup>3</sup> :	
Control Device/ERD ID# <sup>3</sup> :		Fuel HV (BTU/scf):	
H <sub>2</sub> S Content (gr/100 scf):		Operation (hours/year):	
Pump Rate (gpm):			
Water Content (wt %) in: Wet Gas:		Dry Gas:	
Is the glycol dehydration unit exempt from 40CFR63 Section 764(d)? <input type="checkbox"/> Yes <input type="checkbox"/> No: If Yes, answer the following:			
The actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters per day, as determined by the procedures specified in §63.772(b)(1) of this subpart. <input type="checkbox"/> Yes <input type="checkbox"/> No			
The actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram per year (1 ton per year), as determined by the procedures specified in §63.772(b)(2) of this subpart. <input type="checkbox"/> Yes <input type="checkbox"/> No			
Is the glycol dehydration unit located within an Urbanized Area (UA) or Urban Cluster (UC)? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Is a lean glycol pump optimization plan being utilized? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Recycling the glycol dehydration unit back to the flame zone of the reboiler. <input type="checkbox"/> Yes <input type="checkbox"/> No			
Recycling the glycol dehydration unit back to the flame zone of the reboiler and mixed with fuel. <input type="checkbox"/> Yes <input type="checkbox"/> No			
What happens when temperature controller shuts off fuel to the reboiler? <input type="checkbox"/> Still vent emissions to the atmosphere. <input type="checkbox"/> Still vent emissions stopped with valve. <input type="checkbox"/> Still vent emissions to glow plug.			
Please indicate if the following equipment is present. <input type="checkbox"/> Flash Tank <input type="checkbox"/> Burner management system that continuously burns condenser or flash tank vapors			

### Control Device Technical Data

Pollutants Controlled		Manufacturer's Guaranteed Control Efficiency (%)		

### Emissions Data

Emission Unit ID / Emission Point ID <sup>4</sup>	Description	Calculation Methodology <sup>5</sup>	PTE <sup>6</sup>	Controlled Maximum Hourly Emissions (lb/hr)	Controlled Maximum Annual Emissions (tpy)
Reboiler Vent	Reboiler Vent		NO <sub>x</sub>		
			CO		
			VOC		
			SO <sub>2</sub>		
			PM <sub>10</sub>		

			GHG (CO <sub>2</sub> e)		
Glycol Regenerator Still Vent	GRI-GlyCalc™	VOC			
		Benzene			
		Toluene			
		Ethylbenzene			
		Xylenes			
		n-Hexane			
Glycol Flash Tank	GRI-GlyCalc™	VOC			
		Benzene			
		Toluene			
		Ethylbenzene			
		Xylenes			
		n-Hexane			

- 1 Enter the Source Status using the following codes:  
 NS Construction of New Source      ES Existing Source  
 MS Modification of Existing Source
- 2 Enter the date (or anticipated date) of the glycol dehydration unit's installation (construction of source), modification or removal.
- 3 Enter the Air Pollution Control Device (APCD)/Emission Reduction Device (ERD) type designation using the following codes and the device ID number:  
 NA None      CD Condenser      FL Flare  
 CC Condenser/Combustion Combination      TO Thermal Oxidizer      O Other (please list)
- 4 Enter the appropriate Emission Unit ID Numbers and Emission Point ID Numbers for the glycol dehydration unit reboiler vent and glycol regenerator still vent. The glycol dehydration unit reboiler vent and glycol regenerator still vent should be designated RBV-1 and RSV-1, respectively. If the well site incorporates multiple glycol dehydration units, a Glycol Dehydration Emission Unit Data Sheet shall be completed for each, using Source Identification RBV-2 and RSV-2, RBV-3 and RSV-3, etc.
- 5 Enter the Potential Emissions Data Reference designation using the following codes:  
 MD Manufacturer's Data      AP AP-42  
 GR GRI-GLYCalc™      OT Other (please list)
- 6 Enter the Reboiler Vent and Glycol Regenerator Still Vent Potential to Emit (PTE) for the listed regulated pollutants in lbs per hour and tons per year. The Glycol Regenerator Still Vent potential emissions may be determined using the most recent version of the thermodynamic software model GRI-GLYCalc™ (Radian International LLC & Gas Research Institute). **Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc™ Aggregate Calculations Report (shall include emissions reports, equipment reports, and stream reports) to this Glycol Dehydration Emission Unit Data Sheet(s). Backup pumps do not have to be considered as operating for purposes of PTE.** This PTE data shall be incorporated in the Emissions Summary Sheet.

**ATTACHMENT Q**

**Pneumatic Controller Data Sheet**

**ATTACHMENT Q – PNEUMATIC CONTROLLERS  
DATA SHEET**

**Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?**

Yes     No

Please list approximate number.

**Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after September 18, 2015?**

Yes     No

Please list approximate number.

**Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?**

Yes     No

Please list approximate number.

**Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after September 18, 2015?**

Yes     No

Please list approximate number.

**ATTACHMENT R**

**Pneumatic Pump Data Sheet (*Not Applicable*)**

**ATTACHMENT R – PNEUMATIC PUMP  
DATA SHEET**

**Are there any natural gas-driven diaphragm pumps located at a well site that commenced construction, modification or reconstruction after September 18, 2015?**

Yes     No

Please list.

Source ID #	Date	Pump Make/Model	Pump Size

**ATTACHMENT S**

**Air Pollution Control Device Data Sheet**

## **ATTACHMENT S – AIR POLLUTION CONTROL DEVICE / EMISSION REDUCTION DEVICE SHEETS**

Complete the applicable air pollution control device sheets for each flare, vapor combustor, thermal oxidizer, condenser, adsorption system, vapor recovery unit, BTEX Eliminator, Reboiler with and without Glow Plug, etc. at the facility. Use extra pages if necessary.

Emissions calculations must be performed using the most conservative control device efficiency.

*The following five (5) rows are only to be completed if registering an alternative air pollution control device.*

Emission Unit ID: <b>Not Applicable</b>	Make/Model:
Primary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: <input type="checkbox"/> Yes <input type="checkbox"/> No
Secondary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: <input type="checkbox"/> Yes <input type="checkbox"/> No

## VAPOR COMBUSTION (Including Enclosed Combustors)

<b>General Information</b>					
Control Device ID#: <b>9S-COMB1</b>		Installation Date: TBD <input checked="" type="checkbox"/> New <input type="checkbox"/> Modified <input type="checkbox"/> Relocated			
Maximum Rated Total Flow Capacity ~5,833 scfh		Maximum Design Heat Input (from mfg. spec sheet) 140,000 scfd	Design Heat Content 8.69 MMBTU/hr 1,500 BTU/scf		
<b>Control Device Information</b>					
<input checked="" type="checkbox"/> Enclosed Combustion Device <input type="checkbox"/> Thermal Oxidizer		Type of Vapor Combustion Control? <input type="checkbox"/> Elevated Flare <input type="checkbox"/> Ground Flare			
Manufacturer: LEED Enclosed Combustor Model: LC30-0017-000		Hours of operation per year? 8,760			
List the emission units whose emissions are controlled by this vapor control device					
Emission Unit ID#	Emission Source Description		Emission Unit ID#	Emission Source Description	
1S-TK5-8	Four (4) Condensate Storage Tanks				
2S-TK1-4	Four (4) Produced Water Storage Tanks				
7S-TL1, 8S-TL2	Captured Liquid Loading				
<i>If this vapor combustor controls emissions from more than six (6) emission units, please attach additional pages.</i>					
Assist Type (Flares only)		Flare Height	Tip Diameter	Was the design per §60.18?	
<input type="checkbox"/> Steam <input type="checkbox"/> Air <input type="checkbox"/> Pressure <input checked="" type="checkbox"/> Non		~25 feet	4 feet	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Provide determination.	
<b>Waste Gas Information</b>					
Maximum Waste Gas Flow Rate 97 (scfm)		Heat Value of Waste Gas Stream Varies BTU/ft <sup>3</sup>	Exit Velocity of the Emissions Stream Varies (ft/s)		
<i>Provide an attachment with the characteristics of the waste gas stream to be burned.</i>					
<b>Pilot Gas Information</b>					
Number of Pilot Lights 2	Fuel Flow Rate to Pilot Flame per Pilot ~40 scfh	Heat Input per Pilot 50,000 BTU/hr	Will automatic re-ignition be used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
If automatic re-ignition is used, please describe the method. Piezo-electric auto ignitor					
Is pilot flame equipped with a monitor to detect the presence of the flame? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		If Yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infrared <input type="checkbox"/> Ultraviolet <input type="checkbox"/> Camera <input type="checkbox"/> Other:			
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty. ( <i>If unavailable, please indicate</i> ). See attached information on unit					
Additional information attached? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Please attach copies of manufacturer's data sheets, drawings, flame demonstration per §60.18 or §63.11(b) and performance testing.					

## VAPOR COMBUSTION (Including Enclosed Combustors)

### General Information

Control Device ID#: <b>11S-FLARE</b>		Installation Date: TBD <input checked="" type="checkbox"/> New <input type="checkbox"/> Modified <input type="checkbox"/> Relocated	
Maximum Rated Total Flow Capacity ~16,417 scfh                      394,000 scfd		Maximum Design Heat Input (from mfg. spec sheet) 26.2 MMBTU/hr	Design Heat Content 1,600 BTU/scf

### Control Device Information

<input type="checkbox"/> Enclosed Combustion Device <input type="checkbox"/> Thermal Oxidizer		Type of Vapor Combustion Control? <input checked="" type="checkbox"/> Elevated Flare <input type="checkbox"/> Ground Flare	
Manufacturer: National Oil Varco Model: Produced Gas Flare		Hours of operation per year? 8,760	
List the emission units whose emissions are controlled by this vapor control device			
Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
6S-LP	Heater Treater Separator		

*If this vapor combustor controls emissions from more than six (6) emission units, please attach additional pages.*

Assist Type (Flares only)	Flare Height	Tip Diameter	Was the design per §60.18?
<input type="checkbox"/> Steam <input type="checkbox"/> Air <input type="checkbox"/> Pressure <input checked="" type="checkbox"/> Non	TBD	TBD	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Provide determination.

### Waste Gas Information

Maximum Waste Gas Flow Rate 273 (scfm)	Heat Value of Waste Gas Stream Varies BTU/ft <sup>3</sup>	Exit Velocity of the Emissions Stream Varies (ft/s)
---	--	--

*Provide an attachment with the characteristics of the waste gas stream to be burned.*

### Pilot Gas Information

Number of Pilot Lights 1	Fuel Flow Rate to Pilot Flame per Pilot ~60 scfh	Heat Input per Pilot 7,000 BTU/hr	Will automatic re-ignition be used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
-----------------------------	--	--------------------------------------	---

If automatic re-ignition is used, please describe the method. Cimarron re-ignition ignitor box that will be programmed for re-ignition.

Is pilot flame equipped with a monitor to detect the presence of the flame? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If Yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infrared <input type="checkbox"/> Ultraviolet <input type="checkbox"/> Camera <input type="checkbox"/> Other:
--	---

Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty. (*If unavailable, please indicate*). See attached information on unit

Additional information attached? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Please attach copies of manufacturer's data sheets, drawings, flame demonstration per §60.18 or §63.11(b) and performance testing.			
--	--	--	--

## CONDENSER – Not Applicable

### General Information

Control Device ID#:	Installation Date: <input type="checkbox"/> New <input type="checkbox"/> Modified <input type="checkbox"/> Relocated		
Manufacturer:	Model:	Control Device Name:	
Control Efficiency (%):			
Manufacturer's required temperature range for control efficiency.      °F			
Describe the warning and/or alarm system that protects against operation when unit is not meeting the design requirements:			
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.			
Additional information attached? <input type="checkbox"/> Yes <input type="checkbox"/> No Please attach copies of manufacturer's data sheets.			
Is condenser routed to a secondary APCD or ERD? <input type="checkbox"/> Yes <input type="checkbox"/> No			

<b>ADSORPTION SYSTEM – Not Applicable</b>			
<b>General Information</b>			
Control Device ID#:		Installation Date: <input type="checkbox"/> New <input type="checkbox"/> Modified <input type="checkbox"/> Relocated	
Manufacturer:		Model:	Control Device Name:
Design Inlet Volume: scfm		Adsorbent charge per adsorber vessel and number of adsorber vessels:	
Length of Mass Transfer Zone supplied by the manufacturer:		Adsorber diameter: ft	Adsorber area: ft <sup>2</sup>
Adsorbent type and physical properties:		Overall Control Efficiency (%):	
Working Capacity of Adsorbent (%):			
<b>Operating Parameters</b>			
Inlet volume: scfm @ °F			
Adsorption time per adsorption bed (life expectancy):		Breakthrough Capacity (lbs of VOC/100 lbs of adsorbent):	
Temperature range of carbon bed adsorber. °F - °F			
<b>Control Device Technical Data</b>			
Pollutants Controlled		Manufacturer's Guaranteed Control Efficiency (%)	
Describe the warning and/or alarm system that protects against operation when unit is not meeting the design requirements:			
Has the control device been tested by the manufacturer and certified?			
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.			
Additional information attached? <input type="checkbox"/> Yes <input type="checkbox"/> No Please attach copies of manufacturer's data sheets, drawings, and performance testing.			

## VAPOR RECOVERY UNIT

### General Information

Emission Unit ID#: 3S-ENG3

Installation Date: TBD  
 New     Modified     Relocated

### Device Information

Manufacturer: Gas Jack  
 Model: GJ230

List the emission units whose emissions are controlled by this vapor recovery unit  
 (Emission Point ID# 1S-TK5-8 and 2S-TK1-4)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
1S-TK5-8	Four (4) Condensate Storage Tanks		
2S-TK1-4	Four (4) Produced Water Storage Tanks		

*If this vapor recovery unit controls emissions from more than six (6) emission units, please attach additional pages.*

Additional information attached?  Yes     No

Please attach copies of manufacturer's data sheets, drawings, and performance testing.

The registrant may claim a capture and control efficiency of 95 % (which accounts for 5% downtime) for the vapor recovery unit.

The registrant may claim a capture and control efficiency of 98% if the VRU has a backup flare that meet the requirements of Section 8.1.2 of this general permit.

The registrant may claim a capture and control efficiency of 98% if the VRU has a backup VRU.



**Environmental Control Equipment  
Data Sheet**

Item/Tag No.:		Page	1	of	2
Project No.:		Revision:	B		
Project:		Date:	27 February 2014		
P.O. No.:	-	By:	JS		
RFQ No.:	-	Checked:	SG		
		Approved:	MS		

Client:		Ref. P&ID:	-	Supplier:	LEED FABRICATION
Site:				Model No.:	L30-0011-00
Unit/Lease:		Remarks:	-		

**GENERAL**

1 Design Code:		NDE:	LEED Fabrication Standards		
2 Service:		Customer Specs:	<input type="checkbox"/> Yes		
3 Description:	Standard Dual Stage 48 High Efficiency Combustor		<input checked="" type="checkbox"/> No		

**PROCESS DATA**

Gas Composition:	mol %	Process Conditions:		
		Variable	Value	Units
4 Methane		Flow Rate	Up to 140	Mscfd
5 Ethane		Pressure	Up to 12	oz/in <sup>2</sup>
6 Propane		Temperature		°F
7 I-Butane		Molecular Weight		
8 n-Butane		Process/Waste Stream	<input checked="" type="checkbox"/> Gas	<input type="checkbox"/> Liquid
9 I-Pentane		Detailed Process Description / Process Notes:		
10 n-Pentane		1. Turndown 10:1. Based on an expected normal operating rate indicated above. 2. DRE: 98 % operating at design conditions 3. Burner Pressure Drop: Min. 0.10 oz/in <sup>2</sup>		
11 n-Hexane				
12 CO <sub>2</sub>				
13 N <sub>2</sub>				
14 Helium				
15 H <sub>2</sub> O				
16 C <sub>7</sub>				
17 C <sub>8</sub>				
18 C <sub>9</sub>				
19 C <sub>10</sub>				
20 C <sub>11+</sub>				
21	TOTAL			

Other Components:	PPMV	Available Utilities:
H <sub>2</sub> S		Fuel / Pilot Gas      Min. 30psig Natural Gas /Propane 40-50 SCFH
Benzene		Instrument Air      NA
Toluene		Power      120 V / 60 Hz or Solar Power
E-Benzene		Steam      NA
Xylene		Purge Gas

**DESIGN DATA**

Ambient Temperatures:		Noise Performance Requirements:	Under 85 dBA
28 Low, °F	-20	Structural Design Code:	
29 High, °F	120	Wind Design Code:	ASCE
30 Design Conditions: Pressure/Temperature			
31 Max. Relative Humidity, %	90	Pressure/Speed	100 mph
32 Elevation (ASL), ft		Category	
33 Area Classification:	Class I Div 2	Seismic Design Code:	
34 Electrical Design Code:	NEC	Location	

**EQUIPMENT SPECIFICATION**

Type:	<input type="checkbox"/> Elevated <input checked="" type="checkbox"/> Enclosed	Equipment Design:
	<input type="checkbox"/> Above Ground	Component
<input checked="" type="checkbox"/> Stack	<input type="checkbox"/> Multiple Stack	Burner
<input type="checkbox"/> Portable / Trailer		Burner Tip / Assist Gas Burner
		304 SS
		Carbon Steel
Smokeless By:	<input type="checkbox"/> Steam <input type="checkbox"/> Assist Air	Pilot
	<input type="checkbox"/> Gas Assist <input checked="" type="checkbox"/> Staging	Pilot Tip
		304 SS
		Carbon Steel
Stack:	<input checked="" type="checkbox"/> Self Supporting	Firebox / Stack
Flare Burner:	<input type="checkbox"/> Non-Smokeless <input checked="" type="checkbox"/> Smokeless <input type="checkbox"/> Gas Assist	Shell
		Carbon Steel
Pilot:	<input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Continuous	Piping
		Carbon Steel
Pilot Air Inspirator:	<input checked="" type="checkbox"/> Local <input type="checkbox"/> Remote	Nozzles
		Carbon Steel
Pilot Flame Control:	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (Thermocouple)	Flanges
		Carbon Steel
		Blanket
Pilot Ignition:	<input type="checkbox"/> Flamefront Generator <input checked="" type="checkbox"/> Inspiring Ignitor	Insulation
		304 SS
	<input type="checkbox"/> Electronic <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Manual	Insulation Pins
		Refractory
		NA
	<input type="checkbox"/> With Pilot Flame Control	Refractory Anchors
		NA
	<input type="checkbox"/> With Auto Pilot Re-Ignition	Ladders and Platforms
		NA
		Stack Sample Connections
		Per EPA requirements
Pilot Ignition Backup:	<input type="checkbox"/> Manual    Specify: i.e Piezo-Electric	Sight Glass
		2
	<input type="checkbox"/> Battery Pack	Other



**Environmental Control Equipment  
Data Sheet**

<b>Item/Tag No.:</b>		<b>Page</b>	2	of	3
<b>Project No.:</b>		<b>Revision:</b>	B		
<b>Project:</b>		<b>Date:</b>	27 February 2014		
<b>P.O. No.:</b>	-	<b>By:</b>	JS		
<b>RFQ No.:</b>	-	<b>Checked:</b>	SG		
		<b>Approved:</b>	MS		

<b>Client:</b>		<b>Ref. P&amp;ID:</b>	-	<b>Supplier:</b>	LEED FABRICATION
<b>Site:</b>		<b>Remarks:</b>	-	<b>Model No.:</b>	L30-0011-00
<b>Unit/Lease:</b>					

**EQUIPMENT SPECIFICATION**

56	Flame Detection:	<input type="checkbox"/> Thermocouple	<input checked="" type="checkbox"/> Ionization Rod	<b>Auxiliary Equipment</b>	
		<input type="checkbox"/> UV Scanner		Valves	NA
57	<b>General Configuration:</b>			Blowers	NA
58				Dampers	NA
59				Inlet KO / Liquid Seal	NA
60				Flame / Detonation Arrestor	Yes
61				<b>Instrumentation &amp; Controls</b>	
62				Solenoids / Shut-Off Valves	Check with Sales for available config.
63				Flow Meters	NA
64				Calorimeter	NA
65				Pressure Switches/Transmitters	NA
66				Thermocouples	Check with Sales for available config.
67				Temperature Switches/Transmitters	NA
68				BMS	Check with Sales for available config.
69				CEMS	NA
70				Other	NA
71					
72					
73					
74					
75					



**FABRICATION AND INSPECTION**

76	<b>Special requirements</b>	<input type="checkbox"/> Skid Mounted	<input checked="" type="checkbox"/> Concrete Pad	<b>Equipment Info</b>	
		<input type="checkbox"/> Other		<b>Component</b>	<b>Weight / Dimensions</b>
77				<b>Burner</b>	
78				Burner Assembly	
79	<b>Inspection</b>	<input checked="" type="checkbox"/> Vendor Standard		<b>Stack</b>	
80		<input type="checkbox"/> Other. Specify:		Stack Assembly	48 " OD x 25 ' H
81	<b>Material Certification</b>	<input checked="" type="checkbox"/> Vendor Standard		Pilot Tip	
82		<input type="checkbox"/> MTR		Pilot Line(s)	
83		<input type="checkbox"/> Certificate of Compliance		Stack Assembly	
84		<input type="checkbox"/> Other (Specify):		<b>Auxiliary Equipment</b>	
85	<b>NDE</b>	<input checked="" type="checkbox"/> Vendor Standard		Blowers	
86		<input type="checkbox"/> Radiography. Specify:		Inlet KO / Liquid Seal	
87		<input type="checkbox"/> Ultrasonic. Specify:		Flame / Detonation Arrestor	
88		<input type="checkbox"/> Liquid Penetrant.		Skid	
89		<input type="checkbox"/> Magnetic Particles.		<b>Instrumentation &amp; Controls</b>	
90		<input type="checkbox"/> PMI. Specify:		BMS	
91		<input type="checkbox"/> Other. Specify:		Control Panel	
92	<b>Surface Preparation</b>	<input checked="" type="checkbox"/> Vendor Standard			
93		<input type="checkbox"/> Other. Specify:			
94	<b>Paint System</b>	<input checked="" type="checkbox"/> Vendor Standard			
95		<input type="checkbox"/> Other. Specify:			
96	<b>Finished Color</b>	<input checked="" type="checkbox"/> Vendor Standard			
97		<input type="checkbox"/> Other. Specify:			
98					
99					

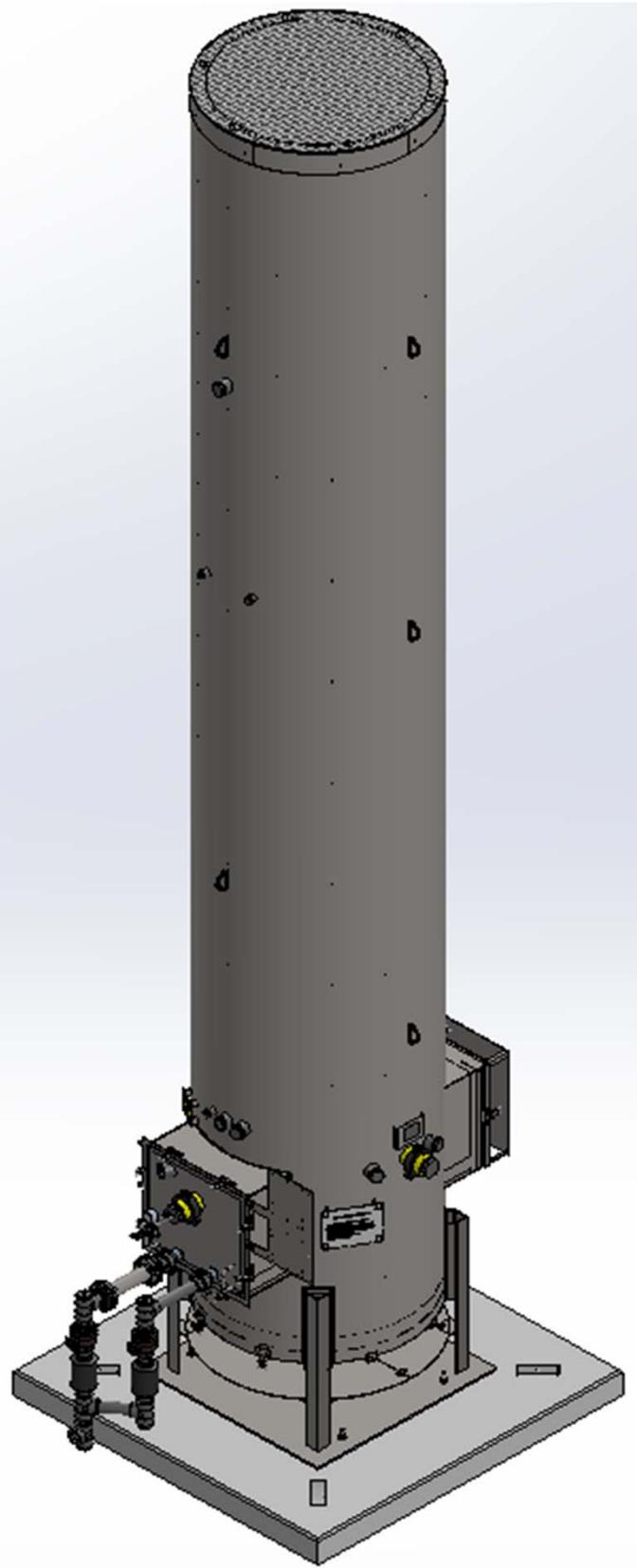
**Additional Notes:**



**Environmental Control Equipment  
Data Sheet**

Item/Tag No.:		Page	3	of	3
Project No.:		Revision:	B		
Project:		Date:	27 February 2014		
P.O. No.:	-	By:	JS		
RFQ No.:	-	Checked:	SG		
		Approved:	MS		
Client:	Ref. P&ID:				
Site:				Supplier:	LEED FABRICATION
Unit/Lease:	Remarks:			Model No.:	L30-0011-00

**GENERAL ARRANGEMENT**



§ MMBTU/hr values are calculated based on 1500 BTU/scf gas

Flare Size	# of Orifices (N)	Pressure (OZ/in <sup>2</sup> )	m <sup>3</sup> /s	mSCFD	MMBTU/hr
18	2	1	0.0021	6.34	0.39
18	2	2	0.0029	8.97	0.56
18	2	3	0.0036	10.99	0.68
18	2	4	0.0042	12.69	0.78
18	2	5	0.0046	14.18	0.88
18	2	6	0.0051	15.54	0.96
18	2	7	0.0055	16.78	1.04
18	2	8	0.0059	17.94	1.11
18	2	9	0.0062	19.03	1.18
18	2	10	0.0066	20.06	1.24
18	2	11	0.0069	21.04	1.30
18	2	12	0.0072	21.97	1.36
18	2	13	0.0075	22.87	1.42
18	2	14	0.0078	23.73	1.47
18	2	15	0.0081	24.57	1.52
18	2	16	0.0083	25.37	1.57
18	2	17	0.0086	26.15	1.62
18	2	18	0.0088	26.91	1.67
24	4	1	0.0042	12.69	0.78
24	4	2	0.0059	17.94	1.11
24	4	3	0.0072	21.97	1.36
24	4	4	0.0083	25.37	1.57
24	4	5	0.0093	28.37	1.76
24	4	6	0.0102	31.08	1.92
24	4	7	0.0110	33.56	2.08
24	4	8	0.0118	35.88	2.22
24	4	9	0.0125	38.06	2.35
24	4	10	0.0131	40.12	2.48
24	4	11	0.0138	42.08	2.60
24	4	12	0.0144	43.95	2.72
24	4	13	0.0150	45.74	2.83
24	4	14	0.0156	47.47	2.94
24	4	15	0.0161	49.13	3.04
24	4	16	0.0166	50.75	3.14
24	4	17	0.0171	52.31	3.24
24	4	18	0.0176	53.82	3.33
36	10	1	0.0104	31.72	1.96
36	10	2	0.0147	44.85	2.78
36	10	3	0.0180	54.93	3.40

36	10	4	0.0208	63.43	3.92
36	10	5	0.0232	70.92	4.39
36	10	6	0.0255	77.69	4.81
36	10	7	0.0275	83.91	5.19
36	10	8	0.0294	89.71	5.55
36	10	9	0.0312	95.15	5.89
36	10	10	0.0329	100.29	6.21
36	10	11	0.0345	105.19	6.51
36	10	12	0.0360	109.87	6.80
36	10	13	0.0375	114.35	7.08
36	10	14	0.0389	118.67	7.34
36	10	15	0.0403	122.83	7.60
36	10	16	0.0416	126.86	7.85
36	10	17	0.0429	130.77	8.09
36	10	18	0.0441	134.56	8.33
48	14	1	0.0146	44.40	2.75
48	14	2	0.0206	62.79	3.89
48	14	3	0.0252	76.91	4.76
48	14	4	0.0291	88.80	5.49
48	14	5	0.0325	99.29	6.14
48	14	6	0.0356	108.76	6.73
48	14	7	0.0385	117.48	7.27
48	14	8	0.0412	125.59	7.77
48	14	9	0.0437	133.21	8.24
48	14	10	0.0460	140.41	8.69
48	14	11	0.0483	147.27	9.11
48	14	12	0.0504	153.81	9.52
48	14	13	0.0525	160.09	9.91
48	14	14	0.0545	166.14	10.28
48	14	15	0.0564	171.97	10.64
48	14	16	0.0582	177.61	10.99
48	14	17	0.0600	183.07	11.33
48	14	18	0.0617	188.38	11.66



16310 BRATTON LANE | BUILDING 3 #350 | AUSTIN, TX 78728

## PGF-3000 CAPACITY LETTER

Dear Mr. Chris Rossman:

Aereon has provided PGF-3000 elevated flares to handle 1 – 3 MMSCFD for Noble Energy's PEN 1, PEN 2, OXF 1, and SHL 1 well pads.

The exit nozzle on each of these flares shall be retrofitted to allow a smaller flowrate to be flared at higher backpressure.

The new nozzle design will allow for the following design conditions:

Maximum Flowrate:	394,000 SCFD
Flare Pressure Drop at design flowrate:	30 psig
Smokeless Flowrate:	394,000 SCFD
Gas Lower Heating Value (LHV):	1,600 Btu/SCF
Total Heat Release at design flowrate:	26.2 MMBtu/hr

Please contact the undersigned with any questions.

Sincerely,

Mirage Thakar  
Manager of Applications Engineering  
Austin, Texas  
February 17, 2017

**ATTACHMENT T**

**Emission Calculations**

**Company Name:** CNX Gas Company LLC  
**Facility Name:** SHR3/40  
**Project Description:** G70-D Application

## Facility-Wide Emission Summary - Controlled

Wells	8 per pad	Carbon equivalent emissions (CO <sub>2</sub> e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:					
Storage Tanks	8 per pad	CO <sub>2</sub> 1					
Sand Separator Tank	0 per pad	CH <sub>4</sub> 25					
GPU Heaters	8 per pad	N <sub>2</sub> O      298					
Line Heater	1 per pad						
Heater Treater	1 per pad						
TEGs	0 per pad						
Compressor	2 per pad						
High Pressure Separator	8 per pad						
Low Pressure Separator	1 per pad						
Vapor Recovery Unit	1 per pad						
Tank Combustor	2 per pad						
Length of lease road	2,500 feet						

Emission Point ID #	Emission Source ID#s	Emission Source Description	NO <sub>x</sub> lb/hr	CO tpy	VOC lb/hr tpy	SO <sub>2</sub> lb/hr tpy	PM <sub>10</sub> lb/hr tpy	PM <sub>2.5</sub> lb/hr tpy	CH <sub>4</sub> lb/hr tpy	CO <sub>2</sub> e lb/hr tpy
3S-ENG3/9E-COMB1	1S-TK5-8	Condensate Storage Vessels	---	---	---	---	---	---	1.88	8.25
3S-ENG3/9E-COMB1	2S-TK1-4	Produced Water Storage Vessels	---	---	0.02	0.07	---	---	0.00	0.01
9E-COMB1, 10E-PILOT	8S-TL2	Produced Water Captured Liquid Loading	---	---	2.4E-05	6.3E-06	---	---	0.00	0.04
9E-COMB1, 10E-PILOT	7S-TL1	Condensate Captured Liquid Loading	---	---	0.89	0.23	---	---	0.00	0.29
3E-ENG1	3S-ENG1	Gas Jack GJ230	0.20	0.89	0.41	1.78	0.11	0.49	2.9E-04	1.3E-03
3E-ENG2	3S-ENG2	Gas Jack GJ230	0.20	0.89	0.41	1.78	0.11	0.49	2.9E-04	1.3E-03
3E-ENG3	3S-ENG3	Gas Jack GJ230	0.20	0.89	0.41	1.78	0.11	0.49	2.9E-04	1.3E-03
9E-COMB1, 10E-PILOT	9S-COMB1, 10S-PILOT	Vapor Combustor Unit	0.86	3.75	0.72	3.15	2.7E-04	1.2E-03	0.01	0.02
11E-FLARE, 12E-PILOT	11S-FLARE, 12S-PILOT	NOV Flare	1.79	7.83	8.15	35.68	0.05	0.22	---	---
4E-GPU1	4S-GPU1	GPU Heater - 1.0 MMBtu/hr	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03
4E-GPU2	4S-GPU2	GPU Heater - 1.0 MMBtu/hr	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03
4E-GPU3	4S-GPU3	GPU Heater - 1.0 MMBtu/hr	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03
4E-GPU4	4S-GPU4	GPU Heater - 1.0 MMBtu/hr	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03
4E-GPU5	4S-GPU5	GPU Heater - 1.0 MMBtu/hr	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03
4E-GPU6	4S-GPU6	GPU Heater - 1.0 MMBtu/hr	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03
4E-GPU7	4S-GPU7	GPU Heater - 1.0 MMBtu/hr	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03
4E-GPU8	4S-GPU8	GPU Heater - 1.0 MMBtu/hr	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03
5E-LH	5S-LH	Line Heater	0.12	0.53	0.10	0.44	0.01	0.03	7.2E-04	3.2E-03
6E-LP	6S-LP	Heater Treater	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03
8E-TL2	8S-TL2	Uncaptured Liquid Loading - Produced Water	---	---	---	---	5.2E-04	1.3E-04	---	---
7E-TL1	7S-TL1	Uncaptured Liquid Loading - Condensate	---	---	---	---	19.03	4.95	---	---
---	Fugitives	---	---	---	---	12.51	---	---	---	34.13
---	Blowdowns	---	---	---	---	2.47	---	---	---	1.20
---	Haul Roads	---	---	---	---	---	---	3.01	0.30	---
<b>Facility Total</b>			<b>4.09</b>	<b>17.93</b>	<b>10.79</b>	<b>47.25</b>	<b>21.84</b>	<b>28.54</b>	<b>0.01</b>	<b>0.05</b>
<b>Facility Total (excluding fugitive emissions)</b>			<b>4.09</b>	<b>17.93</b>	<b>10.79</b>	<b>47.25</b>	<b>21.84</b>	<b>13.56</b>	<b>0.01</b>	<b>0.05</b>

<sup>1</sup>Combustor emissions (9S-COMB1, 11S-FLARE) include pilot emissions.

### Aggregated Facility

Well 12386 Storage Tank Emissions	---	---	---	---	9.8E-05	4.3E-04	---	---	---	0.00	0.00	0.02	0.07
-----------------------------------	-----	-----	-----	-----	---------	---------	-----	-----	-----	------	------	------	------



**Company Name:**  
**Facility Name:**  
**Project Description:**

**CNX Gas Company LLC**  
**SHR3/40**  
**G70-D Application**

## Condensate Storage Vessels

**Potential Throughput.**

<b>Operational Hours</b>	8,760 hrs/yr
<b>Maximum Condensate Throughput<sup>1</sup></b>	500 bbl/day
<b>Maximum Produced Water Throughput<sup>1</sup></b>	1,000 bbl/day

Overall Control Efficiency of VRU with Flare Backup 98%

**Storage Tanks - Uncontrolled**

	Breathing lb/hr	Working tpy	Flashing lb/hr	Total Emissions tpy
Methane	<0.001	<0.001	94.148	94.148
Ethane	<0.001	<0.001	113.904	113.904
Propane	0.753	3.299	5.347	500
i-Butane	0.137	0.601	0.974	0.974
n-Butane	0.289	1.267	0.469	0.469
2,2-Dimethylpropane	0.001	0.004	0.001	0.001
i-Pentane	0.092	0.404	0.150	0.150
n-Pentane	0.091	0.399	0.148	0.148
2,2-Dimethylbutane	0.004	0.017	0.006	0.006
Cyclopentane	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	0.006	0.025	0.009	0.009
2-Methylpentane	0.030	0.129	0.048	0.048
3-Methylpentane	0.019	0.082	0.030	0.030
n-Hexane	0.039	0.172	0.063	0.063
Methylcyclopentane	0.005	0.024	0.009	0.009
Benzene	0.001	0.002	0.001	0.001
Cyclohexane	0.004	0.019	0.007	0.007
2-Methylhexane	0.004	0.017	0.006	0.006
3-Methylhexane	0.011	0.048	0.018	0.018
2,2,4-Trimethylpentane	<0.001	<0.001	<0.001	<0.001
n-Heptane	0.019	0.083	0.031	0.031
Methylcyclohexane	0.011	0.048	0.018	0.018
Toluene	0.001	0.006	0.002	0.002
n-Octane	0.017	0.072	0.027	0.027
Ethylbenzene	0.001	0.003	0.001	0.001
m-Xylene	0.001	0.004	0.002	0.002
o-Xylene	0.001	0.003	0.001	0.001
n-Nonane	0.004	0.016	0.006	0.006
Decane	0.001	0.004	0.002	0.002
Undecane	2.0E-04	0.001	3.3E-04	0.001
Dodecane	3.6E-05	1.6E-04	5.8E-05	2.5E-04
Tridecane	6.7E-06	3.0E-05	1.1E-05	4.8E-05
Tetradecane	1.2E-06	5.3E-06	2.0E-06	8.6E-06
Pentadecane	2.5E-07	1.1E-06	4.1E-07	1.8E-06
Hexadecane	4.0E-08	1.7E-07	6.4E-08	2.8E-07
Heptadecane	9.3E-09	4.1E-08	1.5E-08	6.6E-08
Octadecane	2.2E-09	9.7E-09	3.6E-09	1.6E-08
Nonadecane	4.0E-10	1.7E-09	6.4E-10	2.8E-09
Eicosane	7.4E-11	3.3E-10	1.2E-10	5.3E-10
Heneicosane	2.1E-11	9.3E-11	3.4E-11	1.5E-10
Docosane	5.2E-12	2.3E-11	8.4E-12	3.7E-11
Tricosane	1.0E-12	4.4E-12	1.6E-12	7.1E-12
Tetracosane	4.0E-13	1.7E-12	6.4E-13	2.8E-12
Pentacosane	1.2E-13	5.1E-13	1.9E-13	8.2E-13
Hexacosane	3.7E-14	1.6E-13	5.9E-14	2.6E-13
Heptacosane	7.5E-15	3.3E-14	1.2E-14	5.3E-14
Octacosane	8.2E-16	3.6E-15	1.3E-15	5.8E-15
Nonacosane	3.7E-16	1.6E-15	6.0E-16	2.6E-15
Triacontane	1.3E-17	5.9E-17	2.2E-17	9.5E-17
Hentriacontane	1.7E-15	7.3E-15	2.7E-15	1.2E-14
<b>Total VOC Emissions:</b>	1.54	6.75	2.50	10.94
<b>Total HAP Emissions:</b>	5.4E-02	0.24	0.09	0.39

<sup>1</sup> Uncontrolled emissions calculation using Promax (sum of produced water and condensate). Non-methane emissions are taken from the tank emissions stencil. Methane emissions are taken from the flash stream composition. Condensate and Produced Water throughputs are based on engineering estimates

<sup>2</sup> Emissions from condensate and produced water storage tanks will be primarily controlled by the vapor recovery unit (3S-ENG3)



Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

## Produce Water Storage Vessels

**Potential Throughput.**

Operational Hours	8,760 hrs/yr
Maximum Condensate Throughput <sup>1</sup>	500 bbl/day
Maximum Produced Water Throughput <sup>1</sup>	1,000 bbl/day

Overall Control Efficiency of VRU with Flare Backup

98%

**Storage Tanks - Uncontrolled**

	Breathing lb/hr	Working tpy	Flashing lb/hr	Total Emissions tpy
Methane	<0.001	<0.001	4.989	21.851
Ethane	<0.001	<0.001	1.720	7.535
Propane	7.4E-06	3.2E-05	0.477	0.477
i-Butane	1.5E-07	6.6E-07	3.8E-06	0.038
n-Butane	5.0E-07	2.2E-06	1.3E-05	0.164
2,2-Dimethylpropane	1.8E-10	7.9E-10	4.6E-09	1.5E-04
i-Pentane	2.5E-08	1.1E-07	6.4E-07	0.028
n-Pentane	5.3E-09	2.3E-08	3.1E-08	0.021
2,2-Dimethylbutane	7.6E-11	3.3E-10	4.4E-10	4.6E-04
Cyclopentane	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	4.8E-10	2.1E-09	2.8E-09	0.002
2-Methylpentane	1.1E-09	4.9E-09	6.5E-09	0.008
3-Methylpentane	3.4E-09	1.5E-08	2.0E-08	0.011
n-Hexane	3.2E-10	1.4E-09	1.9E-09	0.007
Methylcyclopentane	2.0E-09	8.9E-09	1.2E-08	0.005
Benzene	1.2E-07	5.4E-07	7.2E-07	0.005
Cyclohexane	5.4E-09	2.4E-08	3.1E-08	0.009
2-Methylhexane	1.7E-11	7.3E-11	9.6E-11	4.2E-10
3-Methylhexane	5.7E-11	2.5E-10	3.3E-10	1.5E-09
2,2,4-Trimethylpentane	<0.001	<0.001	<0.001	<0.001
n-Heptane	2.8E-11	1.2E-10	1.6E-10	7.0E-10
Methylcyclohexane	1.4E-09	6.1E-09	8.1E-09	3.6E-08
Toluene	9.4E-08	4.1E-07	5.4E-07	2.4E-06
n-Octane	2.1E-12	9.2E-12	1.2E-11	5.4E-11
Ethylbenzene	1.1E-08	4.9E-08	6.4E-08	2.8E-07
m-Xylene	1.3E-08	5.6E-08	7.5E-08	3.3E-07
o-Xylene	1.6E-08	6.9E-08	9.2E-08	4.0E-07
n-Nonane	9.4E-14	4.1E-13	5.4E-13	2.4E-12
Decane	1.1E-15	4.8E-15	6.4E-15	2.8E-14
Undecane	5.0E-17	2.2E-16	2.9E-16	1.3E-15
Dodecane	3.3E-17	1.4E-16	1.9E-16	8.4E-16
Tridecane	1.3E-17	5.9E-17	7.8E-17	3.4E-16
Tetradecane	4.1E-18	1.8E-17	2.4E-17	1.0E-16
Pentadecane	1.4E-18	6.0E-18	7.9E-18	3.5E-17
Hexadecane	5.1E-19	2.2E-18	3.0E-18	1.3E-17
Heptadecane	2.8E-19	1.2E-18	1.6E-18	7.0E-18
Octadecane	1.0E-19	4.6E-19	6.1E-19	2.7E-18
Nonadecane	2.6E-20	1.1E-19	1.5E-19	6.5E-19
Eicosane	5.0E-21	2.2E-20	2.9E-20	1.3E-19
Heneicosane	1.3E-21	5.9E-21	7.8E-21	3.4E-20
Docosane	3.5E-22	1.5E-21	2.0E-21	8.9E-21
Tricosane	7.0E-23	3.0E-22	4.0E-22	1.8E-21
Tetracosane	2.6E-23	1.2E-22	1.5E-22	6.7E-22
Pentacosane	7.7E-24	3.4E-23	4.4E-23	1.9E-22
Hexacosane	2.4E-24	1.1E-23	1.4E-23	6.1E-23
Heptacosane	5.0E-25	2.2E-24	2.9E-24	1.3E-23
Octacosane	5.9E-26	2.6E-25	3.4E-25	1.5E-24
Nonacosane	2.5E-26	1.1E-25	1.5E-25	6.4E-25
Triacontane	9.2E-28	4.0E-27	5.3E-27	2.3E-26
Henicosane	<0.001	<0.001	<0.001	<0.001
<b>Total VOC Emissions:</b>	0.00	0.00	0.82	3.61
<b>Total HAP Emissions:</b>	2.6E-07	0.00	0.07	0.31

<sup>1</sup> Uncontrolled emissions calculation using Promax (sum of produced water and condensate). Non-methane emissions are taken from the tank emissions stencil. Methane emissions are taken from the flash stream composition. Condensate and Produced Water throughputs are based on engineering estimates

<sup>2</sup> Emissions from condensate and produced water storage tanks will be primarily controlled by the vapor recovery unit (3S-ENG3



Company Name:  
Facility Name:  
Project Description:

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## Produced Water Liquid Loading

Throughput 15,330,000 gal/yr  
 Capture Efficiency 70% non-tested tanker trucks  
 Control Efficiency 98% Combustor destruction efficiency

Liquid Loading Emissions

	Uncontrolled Emissions		Uncaptured Emissions		Controlled Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Propane	0.002	3.97E-04	4.58E-04	1.19E-04	2.14E-05	5.55E-06
i-Butane	3.12E-05	8.11E-06	9.35E-06	2.43E-06	4.36E-07	1.13E-07
n-Butane	1.04E-04	2.70E-05	3.12E-05	8.11E-06	1.45E-06	3.78E-07
2,2-Dimethylpropane	3.72E-08	9.68E-09	1.12E-08	2.90E-09	5.21E-10	1.35E-10
i-Pentane	5.22E-06	1.36E-06	1.57E-06	4.07E-07	7.31E-08	1.90E-08
n-Pentane	1.09E-06	2.83E-07	3.27E-07	8.50E-08	1.53E-08	3.97E-09
2,2-Dimethylbutane	1.57E-08	4.08E-09	4.70E-09	1.22E-09	2.20E-10	5.71E-11
Cyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	9.89E-08	2.57E-08	2.97E-08	7.71E-09	1.38E-09	3.60E-10
2-Methylpentane	2.32E-07	6.03E-08	6.96E-08	1.81E-08	3.25E-09	8.45E-10
3-Methylpentane	6.99E-07	1.82E-07	2.10E-07	5.45E-08	9.79E-09	2.55E-09
n-Hexane	6.69E-08	1.74E-08	2.01E-08	5.22E-09	9.37E-10	2.44E-10
Methylcyclopentane	4.19E-07	1.09E-07	1.26E-07	3.27E-08	5.86E-09	1.52E-09
Benzene	2.55E-05	6.64E-06	7.66E-06	1.99E-06	3.58E-07	9.30E-08
Cyclohexane	1.12E-06	2.90E-07	3.35E-07	8.71E-08	1.56E-08	4.06E-09
2-Methylhexane	3.43E-09	8.91E-10	1.03E-09	2.67E-10	4.80E-11	1.25E-11
3-Methylhexane	1.18E-08	3.06E-09	3.53E-09	9.19E-10	1.65E-10	4.29E-11
2,2,4-Trimethylpentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	5.70E-09	1.48E-09	1.71E-09	4.45E-10	7.99E-11	2.08E-11
Methylcyclohexane	2.90E-07	7.53E-08	8.69E-08	2.26E-08	4.06E-09	1.05E-09
Toluene	1.94E-05	5.03E-06	5.81E-06	1.51E-06	2.71E-07	7.05E-08
n-Octane	4.35E-10	1.13E-10	1.31E-10	3.40E-11	6.10E-12	1.58E-12
Ethylbenzene	2.29E-06	5.96E-07	6.87E-07	1.79E-07	3.21E-08	8.34E-09
m-Xylene	2.66E-06	6.91E-07	7.97E-07	2.07E-07	3.72E-08	9.67E-09
o-Xylene	3.26E-06	8.47E-07	9.77E-07	2.54E-07	4.56E-08	1.19E-08
n-Nonane	1.94E-11	5.03E-12	5.81E-12	1.51E-12	2.71E-13	7.04E-14
Decane	2.26E-13	5.89E-14	6.79E-14	1.77E-14	3.17E-15	8.24E-16
Undecane	1.04E-14	2.70E-15	3.12E-15	8.10E-16	1.45E-16	3.78E-17
Dodecane	6.80E-15	1.77E-15	2.04E-15	5.30E-16	9.52E-17	2.48E-17
Tridecane	2.76E-15	7.18E-16	8.29E-16	2.15E-16	3.87E-17	1.01E-17
Tetradecane	8.37E-16	2.18E-16	2.51E-16	6.53E-17	1.17E-17	3.05E-18
Pentadecane	2.81E-16	7.32E-17	8.44E-17	2.20E-17	3.94E-18	1.02E-18
Hexadecane	1.05E-16	2.74E-17	3.16E-17	8.22E-18	1.48E-18	3.84E-19
Heptadecane	5.70E-17	1.48E-17	1.71E-17	4.45E-18	7.99E-19	2.08E-19
Octadecane	2.17E-17	5.63E-18	6.50E-18	1.69E-18	3.03E-19	7.88E-20
Nonadecane	5.31E-18	1.38E-18	1.59E-18	4.14E-19	7.43E-20	1.93E-20
Eicosane	1.03E-18	2.69E-19	3.10E-19	8.06E-20	1.45E-20	3.76E-21
Heneicosane	2.78E-19	7.22E-20	8.33E-20	2.17E-20	3.89E-21	1.01E-21
Docosane	7.22E-20	1.88E-20	2.16E-20	5.63E-21	1.01E-21	2.63E-22
Tricosane	1.44E-20	3.74E-21	4.31E-21	1.12E-21	2.01E-22	5.23E-23
Tetracosane	5.43E-21	1.41E-21	1.63E-21	4.23E-22	7.60E-23	1.98E-23
Pentacosane	1.58E-21	4.11E-22	4.74E-22	1.23E-22	2.21E-23	5.75E-24
Hexacosane	4.98E-22	1.30E-22	1.49E-22	3.89E-23	6.97E-24	1.81E-24
Heptacosane	1.04E-22	2.69E-23	3.11E-23	8.08E-24	1.45E-24	3.77E-25
Octacosane	1.22E-23	3.18E-24	3.66E-24	9.53E-25	1.71E-25	4.45E-26
Nonacosane	5.23E-24	1.36E-24	1.57E-24	4.08E-25	7.33E-26	1.91E-26
Triaccontane	1.89E-25	4.93E-26	5.68E-26	1.48E-26	2.65E-27	6.90E-28
Hentriacontane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<b>Total VOC Emissions:</b>	1.72E-03	4.48E-04	5.17E-04	1.34E-04	2.41E-05	6.27E-06
<b>Total HAP Emissions:</b>	5.35E-05	1.39E-05	1.60E-05	4.17E-06	7.48E-07	1.95E-07

<sup>1</sup> Uncontrolled emissions calculation using Promax (sum of produced water and condensate).

<sup>2</sup> Hourly emissions assume two hours of loading per day, five days per week.

<sup>3</sup> Liquid loading throughput is based on the produced water throughput at the wellpad

Company Name:  
Facility Name:  
Project Description:

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## Condensate Liquid Loading

Throughput                    7,665,000                    gal/yr  
 Capture Efficiency            70% non-tested tanker trucks  
 Control Efficiency            98% Combustor destruction efficiency

### Liquid Loading Emissions

	Uncontrolled Emissions		Uncaptured Emissions		Controlled Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Propane	31.008	8.062	9.302	2.419	0.434	0.113
i-Butane	5.650	1.469	1.695	0.441	0.079	0.021
n-Butane	11.908	3.096	3.572	0.929	0.167	0.043
2,2-Dimethylpropane	0.035	0.009	0.011	0.003	4.91E-04	1.28E-04
i-Pentane	3.798	0.988	1.140	0.296	0.053	0.014
n-Pentane	3.751	0.975	1.125	0.293	0.053	0.014
2,2-Dimethylbutane	0.158	0.041	0.047	0.012	0.002	0.001
Cyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	0.238	0.062	0.071	0.019	0.003	0.001
2-Methylpentane	1.215	0.316	0.365	0.095	0.017	0.004
3-Methylpentane	0.768	0.200	0.231	0.060	0.011	0.003
n-Hexane	1.612	0.419	0.484	0.126	0.023	0.006
Methylcyclopentane	0.223	0.058	0.067	0.017	0.003	0.001
Benzene	0.021	0.005	0.006	0.002	2.93E-04	7.62E-05
Cyclohexane	0.180	0.047	0.054	0.014	0.003	0.001
2-Methylhexane	0.158	0.041	0.047	0.012	0.002	0.001
3-Methylhexane	0.451	0.117	0.135	0.035	0.006	0.002
2,2,4-Trimethylpentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	0.784	0.204	0.235	0.061	0.011	0.003
Methylcyclohexane	0.452	0.117	0.135	0.035	0.006	0.002
Toluene	0.058	0.015	0.017	0.005	0.001	2.12E-04
n-Octane	0.681	0.177	0.204	0.053	0.010	0.002
Ethylbenzene	0.025	0.007	0.008	0.002	3.51E-04	9.12E-05
m-Xylene	0.040	0.010	0.012	0.003	0.001	1.47E-04
o-Xylene	0.027	0.007	0.008	0.002	3.71E-04	9.66E-05
n-Nonane	0.153	0.040	0.046	0.012	0.002	0.001
Decane	0.042	0.011	0.013	0.003	0.001	1.54E-04
Undecane	0.008	0.002	0.003	0.001	1.17E-04	3.05E-05
Dodecane	0.001	3.81E-04	4.40E-04	1.14E-04	2.05E-05	5.34E-06
Tridecane	2.78E-04	7.22E-05	8.33E-05	2.17E-05	3.89E-06	1.01E-06
Tetradecane	5.00E-05	1.30E-05	1.50E-05	3.90E-06	6.99E-07	1.82E-07
Pentadecane	1.03E-05	2.69E-06	3.10E-06	8.06E-07	1.45E-07	3.76E-08
Hexadecane	1.63E-06	4.23E-07	4.88E-07	1.27E-07	2.28E-08	5.92E-09
Heptadecane	3.84E-07	9.98E-08	1.15E-07	2.99E-08	5.37E-09	1.40E-09
Octadecane	9.10E-08	2.37E-08	2.73E-08	7.10E-09	1.27E-09	3.31E-10
Nonadecane	1.63E-08	4.25E-09	4.90E-09	1.27E-09	2.29E-10	5.94E-11
Eicosane	3.07E-09	7.97E-10	9.20E-10	2.39E-10	4.29E-11	1.12E-11
Heneicosane	8.75E-10	2.28E-10	2.63E-10	6.83E-11	1.23E-11	3.19E-12
Docosane	2.14E-10	5.56E-11	6.41E-11	1.67E-11	2.99E-12	7.78E-13
Tricosane	4.12E-11	1.07E-11	1.23E-11	3.21E-12	5.76E-13	1.50E-13
Tetracosane	1.63E-11	4.24E-12	4.89E-12	1.27E-12	2.28E-13	5.94E-14
Pentacosane	4.77E-12	1.24E-12	1.43E-12	3.72E-13	6.68E-14	1.74E-14
Hexacosane	1.50E-12	3.91E-13	4.51E-13	1.17E-13	2.10E-14	5.47E-15
Heptacosane	3.10E-13	8.06E-14	9.30E-14	2.42E-14	4.34E-15	1.13E-15
Octacosane	3.39E-14	8.80E-15	1.02E-14	2.64E-15	4.74E-16	1.23E-16
Nonacosane	1.54E-14	3.99E-15	4.61E-15	1.20E-15	2.15E-16	5.59E-17
Triacontane	5.53E-16	1.44E-16	1.66E-16	4.31E-17	7.74E-18	2.01E-18
Hentriacontane	6.88E-14	1.79E-14	2.06E-14	5.36E-15	9.63E-16	2.50E-16
<b>Total VOC Emissions:</b>	63.45	16.50	19.03	4.95	0.89	0.23
<b>Total HAP Emissions:</b>	2.24	0.58	0.67	0.17	0.03	0.01

<sup>1</sup> Uncontrolled emissions calculation using Promax (sum of produced water and condensate).

<sup>2</sup> Hourly emissions assume two hours of loading per day, five days per week.

<sup>3</sup> Liquid loading throughput is based on the condensate loading throughput at the wellpad

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
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## GPU Heaters

Source Designation:	4S-GPU1 to 4S-GPU8
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,249
Heat Input (MMBtu/hr)	1.00
Fuel Consumption (MMscf/hr):	8.01E-04
Potential Annual Hours of Operation (hr/yr):	8,760

**Criteria and Manufacturer Specific Pollutant Emission Rates:**

Pollutant	Emission Factor (lb/MMscf) <sup>1,4</sup>	Potential Emissions	
		(lb/hr) <sup>2</sup>	(tons/yr) <sup>3</sup>
NO <sub>x</sub>	100	0.08	0.35
CO	84	0.07	0.29
VOC	5.5	4.4E-03	0.02
SO <sub>2</sub>	0.6	4.8E-04	2.1E-03
PM Total	7.6	0.01	0.03
PM Condensable	5.7	4.6E-03	0.02
PM <sub>10</sub> (Filterable)	1.9	1.5E-03	0.01
PM <sub>2.5</sub> (Filterable)	1.9	1.5E-03	0.01
Lead	5.00E-04	4.0E-07	1.8E-06
CO <sub>2</sub>	117.0	117.00	512.45
CH <sub>4</sub>	2.21E-03	2.2E-03	9.7E-03
N <sub>2</sub> O	2.21E-04	2.2E-04	9.7E-04

**Hazardous Air Pollutant (HAP) Potential Emissions:**

Pollutant	Emission Factor (lb/MMscf) <sup>1</sup>	Potential Emissions	
		(lb/hr) <sup>2</sup>	(tons/yr) <sup>3</sup>
<b>HAPs:</b>			
2-Methylnaphthalene	2.4E-05	1.9E-08	8.4E-08
3-Methylchloranthrene	1.8E-06	1.4E-09	6.3E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.3E-08	5.6E-08
Acenaphthene	1.8E-06	1.4E-09	6.3E-09
Acenaphthylene	1.8E-06	1.4E-09	6.3E-09
Anthracene	2.4E-06	1.9E-09	8.4E-09
Benz(a)anthracene	1.8E-06	1.4E-09	6.3E-09
Benzene	2.1E-03	1.7E-06	7.4E-06
Benzo(a)pyrene	1.2E-06	9.6E-10	4.2E-09
Benzo(b)fluoranthene	1.8E-06	1.4E-09	6.3E-09
Benzo(g,h,i)perylene	1.2E-06	9.6E-10	4.2E-09
Benzo(k)fluoranthene	1.8E-06	1.4E-09	6.3E-09
Chrysene	1.8E-06	1.4E-09	6.3E-09
Dibeno(a,h) anthracene	1.2E-06	9.6E-10	4.2E-09
Dichlorobenzene	1.2E-03	9.6E-07	4.2E-06
Fluoranthene	3.0E-06	2.4E-09	1.1E-08
Fluorene	2.8E-06	2.2E-09	9.8E-09
Formaldehyde	7.5E-02	6.0E-05	2.6E-04
Hexane	1.8E+00	1.4E-03	6.3E-03
Indo(1,2,3-cd)pyrene	1.8E-06	1.4E-09	6.3E-09
Naphthalene	6.1E-04	4.9E-07	2.1E-06
Phenanthrene	1.7E-05	1.4E-08	6.0E-08
Pyrene	5.0E-06	4.0E-09	1.8E-08
Toluene	3.4E-03	2.7E-06	1.2E-05
Arsenic	2.0E-04	1.6E-07	7.0E-07
Beryllium	1.2E-05	9.6E-09	4.2E-08
Cadmium	1.1E-03	8.8E-07	3.9E-06
Chromium	1.4E-03	1.1E-06	4.9E-06
Cobalt	8.4E-05	6.7E-08	2.9E-07
Manganese	3.8E-04	3.0E-07	1.3E-06
Mercury	2.6E-04	2.1E-07	9.1E-07
Nickel	2.1E-03	1.7E-06	7.4E-06
Selenium	2.4E-05	1.9E-08	8.4E-08
<b>Total HAP</b>		<b>1.5E-03</b>	<b>6.6E-03</b>

<sup>1</sup> Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

<sup>2</sup> Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

<sup>3</sup> Annual Emissions (tons/yr)<sub>Potential</sub> = (lb/hr)<sub>Emissions</sub> × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

<sup>4</sup> GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

Company Name:  
Facility Name:  
Project Description:

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## Line Heater

Source Designation:	5S-LH
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,249
Heat Input (MMBtu/hr)	1.50
Fuel Consumption (MMscf/hr):	1.20E-03
Potential Annual Hours of Operation (hr/yr):	8,760

**Criteria and Manufacturer Specific Pollutant Emission Rates:**

Pollutant	Emission Factor (lb/MMscf) <sup>1,4</sup>	Potential Emissions	
		(lb/hr) <sup>2</sup>	(tons/yr) <sup>3</sup>
NO <sub>x</sub>	100	0.12	0.53
CO	84	0.10	0.44
VOC	5.5	0.01	0.03
SO <sub>2</sub>	0.6	7.2E-04	3.2E-03
PM Total	7.6	0.01	0.04
PM Condensable	5.7	0.01	0.03
PM <sub>10</sub> (Filterable)	1.9	2.3E-03	0.01
PM <sub>2.5</sub> (Filterable)	1.9	2.3E-03	0.01
Lead	5.00E-04	6.0E-07	2.6E-06
CO <sub>2</sub>	117.0	175.50	768.67
CH <sub>4</sub>	2.21E-03	3.3E-03	1.4E-02
N <sub>2</sub> O	2.21E-04	3.3E-04	1.4E-03

**Hazardous Air Pollutant (HAP) Potential Emissions:**

Pollutant	Emission Factor (lb/MMscf) <sup>1</sup>	Potential Emissions	
		(lb/hr) <sup>2</sup>	(tons/yr) <sup>3</sup>
<b>HAPs:</b>			
2-Methylnaphthalene	2.4E-05	2.9E-08	1.3E-07
3-Methylchloranthrene	1.8E-06	2.2E-09	9.5E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.9E-08	8.4E-08
Acenaphthene	1.8E-06	2.2E-09	9.5E-09
Acenaphthylene	1.8E-06	2.2E-09	9.5E-09
Anthracene	2.4E-06	2.9E-09	1.3E-08
Benz(a)anthracene	1.8E-06	2.2E-09	9.5E-09
Benzene	2.1E-03	2.5E-06	1.1E-05
Benz(a)pyrene	1.2E-06	1.4E-09	6.3E-09
Benz(b)fluoranthene	1.8E-06	2.2E-09	9.5E-09
Benz(g,h,i)perylene	1.2E-06	1.4E-09	6.3E-09
Benz(k)fluoranthene	1.8E-06	2.2E-09	9.5E-09
Chrysene	1.8E-06	2.2E-09	9.5E-09
Dibeno(a,h) anthracene	1.2E-06	1.4E-09	6.3E-09
Dichlorobenzene	1.2E-03	1.4E-06	6.3E-06
Fluoranthene	3.0E-06	3.6E-09	1.6E-08
Fluorene	2.8E-06	3.4E-09	1.5E-08
Formaldehyde	7.5E-02	9.0E-05	3.9E-04
Hexane	1.8E+00	2.2E-03	9.5E-03
Indo(1,2,3-cd)pyrene	1.8E-06	2.2E-09	9.5E-09
Naphthalene	6.1E-04	7.3E-07	3.2E-06
Phenanthrene	1.7E-05	2.0E-08	8.9E-08
Pyrene	5.0E-06	6.0E-09	2.6E-08
Toluene	3.4E-03	4.1E-06	1.8E-05
Arsenic	2.0E-04	2.4E-07	1.1E-06
Beryllium	1.2E-05	1.4E-08	6.3E-08
Cadmium	1.1E-03	1.3E-06	5.8E-06
Chromium	1.4E-03	1.7E-06	7.4E-06
Cobalt	8.4E-05	1.0E-07	4.4E-07
Manganese	3.8E-04	4.6E-07	2.0E-06
Mercury	2.6E-04	3.1E-07	1.4E-06
Nickel	2.1E-03	2.5E-06	1.1E-05
Selenium	2.4E-05	2.9E-08	1.3E-07
<b>Total HAP</b>		<b>2.3E-03</b>	<b>9.9E-03</b>

<sup>1</sup> Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

<sup>2</sup> Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

<sup>3</sup> Annual Emissions (tons/yr)<sub>Potential</sub> = (lb/hr)<sub>Emissions</sub> × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

<sup>4</sup> GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

## Heater Treater

Source Designation:	6S-LP
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,249
Heat Input (MMBtu/hr)	1.00
Fuel Consumption (MMscf/hr):	8.01E-04
Potential Annual Hours of Operation (hr/yr):	8,760

### Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf) <sup>1,4</sup>	Potential Emissions	
		(lb/hr) <sup>2</sup>	(tons/yr) <sup>3</sup>
NO <sub>x</sub>	100	0.08	0.35
CO	84	0.07	0.29
VOC	5.5	4.4E-03	0.02
SO <sub>2</sub>	0.6	4.8E-04	2.1E-03
PM Total	7.6	0.01	0.03
PM Condensable	5.7	4.6E-03	0.02
PM <sub>10</sub> (Filterable)	1.9	1.5E-03	0.01
PM <sub>2.5</sub> (Filterable)	1.9	1.5E-03	0.01
Lead	5.00E-04	4.0E-07	1.8E-06
CO <sub>2</sub>	117.0	117.00	512.45
CH <sub>4</sub>	2.21E-03	2.2E-03	9.7E-03
N <sub>2</sub> O	2.21E-04	2.2E-04	9.7E-04

### Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) <sup>1</sup>	Potential Emissions	
		(lb/hr) <sup>2</sup>	(tons/yr) <sup>3</sup>
<b>HAPs:</b>			
2-Methylnaphthalene	2.4E-05	1.9E-08	8.4E-08
3-Methylchloranthrene	1.8E-06	1.4E-09	6.3E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.3E-08	5.6E-08
Acenaphthene	1.8E-06	1.4E-09	6.3E-09
Acenaphthylene	1.8E-06	1.4E-09	6.3E-09
Anthracene	2.4E-06	1.9E-09	8.4E-09
Benz(a)anthracene	1.8E-06	1.4E-09	6.3E-09
Benzene	2.1E-03	1.7E-06	7.4E-06
Benz(a)pyrene	1.2E-06	9.6E-10	4.2E-09
Benz(b)fluoranthene	1.8E-06	1.4E-09	6.3E-09
Benz(g,h,i)perylene	1.2E-06	9.6E-10	4.2E-09
Benz(k)fluoranthene	1.8E-06	1.4E-09	6.3E-09
Chrysene	1.8E-06	1.4E-09	6.3E-09
Dibeno(a,h) anthracene	1.2E-06	9.6E-10	4.2E-09
Dichlorobenzene	1.2E-03	9.6E-07	4.2E-06
Fluoranthene	3.0E-06	2.4E-09	1.1E-08
Fluorene	2.8E-06	2.2E-09	9.8E-09
Formaldehyde	7.5E-02	6.0E-05	2.6E-04
Hexane	1.8E+00	1.4E-03	6.3E-03
Indo(1,2,3-cd)pyrene	1.8E-06	1.4E-09	6.3E-09
Naphthalene	6.1E-04	4.9E-07	2.1E-06
Phenanthrene	1.7E-05	1.4E-08	6.0E-08
Pyrene	5.0E-06	4.0E-09	1.8E-08
Toluene	3.4E-03	2.7E-06	1.2E-05
Arsenic	2.0E-04	1.6E-07	7.0E-07
Beryllium	1.2E-05	9.6E-09	4.2E-08
Cadmium	1.1E-03	8.8E-07	3.9E-06
Chromium	1.4E-03	1.1E-06	4.9E-06
Cobalt	8.4E-05	6.7E-08	2.9E-07
Manganese	3.8E-04	3.0E-07	1.3E-06
Mercury	2.6E-04	2.1E-07	9.1E-07
Nickel	2.1E-03	1.7E-06	7.4E-06
Selenium	2.4E-05	1.9E-08	8.4E-08
<b>Total HAP</b>		<b>1.5E-03</b>	<b>6.6E-03</b>

<sup>1</sup> Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

<sup>2</sup> Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

<sup>3</sup> Annual Emissions (tons/yr)<sub>Potential</sub> = (lb/hr)<sub>Emissions</sub> × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

<sup>4</sup> GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

Company Name: CNX Gas Company LLC  
 Facility Name: SHR3/40  
 Project Description: G70-D Application

### VRU Engine

**Engine Information:**

Manufacturer:	Gas Jack
Model No.:	GI230
Engine ID	3S-ENG1 to 3S-ENG3
Stroke Cycle:	4-stroke
Type of Burn:	Rich
Rated Horsepower (bhp):	46

**Engine Fuel Information:**

Fuel Type:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,249
Specific Fuel Consumption (Btu/bhp-hr):	10,777
Maximum Fuel Consumption at 100% Load (scf/hr):	397.06
Heat Input (MMBtu/hr):	0.50
Potential Fuel Consumption (MMBtu/yr):	4,343
Max. Fuel Consumption at 100% (MMscf/hr):	0.0004
Max. Fuel Consumption (MMscf/yr):	3.5
Max. Annual Hours of Operation (hr/yr):	8,760

**Engine Emissions Data:**

Pollutant	Emission Factor	Units	Maximum Potential Emissions		Estimation Basis / Emission Factor Source
			lbs/hr	tpy	
NO <sub>x</sub>	2.00	g/bhp-hr	0.20	0.89	Vendor Spec
VOC (excludes HCHO)	1.00	g/bhp-hr	0.10	0.44	Vendor Spec
VOC (includes HCHO)	---	---	0.11	0.49	VOC + HCHO
CO	4.00	g/bhp-hr	0.41	1.78	Vendor Spec
SO <sub>x</sub>	0.001	lb/MMBtu	<0.01	<0.01	AP-42, Table 3.2-3 (Aug-2000)
PM <sub>10</sub>	0.02	lb/MMBtu	0.01	0.04	AP-42, Table 3.2-3 (Aug-2000)
PM <sub>2.5</sub>	0.02	lb/MMBtu	0.01	0.04	AP-42, Table 3.2-3 (Aug-2000)
Formaldehyde (HCHO)	0.02	lb/MMBtu	0.01	0.04	AP-42, Table 3.2-3 (Aug-2000)
GHG (CO <sub>2</sub> e)	See Table Below		52	229	40 CFR 98, Tables C-1 & C-2
Other (Total HAP)	See Table Below		0.02	0.07	AP-42, Table 3.2-3 (Aug-2000)

**Notes:**

1. PM<sub>10</sub> and PM<sub>2.5</sub> are total values (filterable + condensable).
2. GHG (CO<sub>2</sub>e) is carbon dioxide equivalent, which is the summation of CO<sub>2</sub> (GWP = 1) + CH<sub>4</sub> (GWP = 25) + N<sub>2</sub>O (GWP = 298).
3. Total HAP is the summation of all hazardous air pollutants for which there is a published emission factor for this source type.

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

### VRU Engine

#### Greenhouse Gas (GHG) & Hazardous Air Pollutant (HAP) Emissions Calculations:

Pollutant	Emission Factor	Units	Maximum Potential Emissions		Estimation Basis / Emission Factor Source
			lbs/hr	tpy	
<b>GHGs:</b>					
CO <sub>2</sub>	515.00	g/bhp-hr	52.23	228.76	Manufac Spec
CH <sub>4</sub>	0.001	kg/MMBtu	1.1E-03	4.8E-03	40 CFR 98, Table C-2
N <sub>2</sub> O	0.0001	kg/MMBtu	1.1E-04	4.8E-04	40 CFR 98, Table C-2
<b>GHG (CO<sub>2</sub>e)</b>			<b>52</b>	<b>229</b>	
<b>Organic HAPs:</b>					
1,1,2,2-Tetrachloroethane	2.53E-05	lb/MMBtu	1.3E-05	5.5E-05	AP-42, Table 3.2-3 (Aug-2000)
1,1,2-Trichloroethane	1.53E-05	lb/MMBtu	7.6E-06	3.3E-05	AP-42, Table 3.2-3 (Aug-2000)
1,3-Butadiene	6.63E-04	lb/MMBtu	3.3E-04	1.4E-03	AP-42, Table 3.2-3 (Aug-2000)
1,3-Dichloropropene	1.27E-05	lb/MMBtu	6.3E-06	2.8E-05	AP-42, Table 3.2-3 (Aug-2000)
Acetaldehyde	2.79E-03	lb/MMBtu	1.4E-03	6.1E-03	AP-42, Table 3.2-3 (Aug-2000)
Acrolein	2.63E-03	lb/MMBtu	1.3E-03	5.7E-03	AP-42, Table 3.2-3 (Aug-2000)
Benzene	1.58E-03	lb/MMBtu	7.8E-04	3.4E-03	AP-42, Table 3.2-3 (Aug-2000)
Carbon Tetrachloride	1.77E-05	lb/MMBtu	8.8E-06	3.8E-05	AP-42, Table 3.2-3 (Aug-2000)
Chlorobenzene	1.29E-05	lb/MMBtu	6.4E-06	2.8E-05	AP-42, Table 3.2-3 (Aug-2000)
Chloroform	1.37E-05	lb/MMBtu	6.8E-06	3.0E-05	AP-42, Table 3.2-3 (Aug-2000)
Ethylbenzene	2.48E-05	lb/MMBtu	1.2E-05	5.4E-05	AP-42, Table 3.2-3 (Aug-2000)
Ethylene Dibromide	2.13E-05	lb/MMBtu	1.1E-05	4.6E-05	AP-42, Table 3.2-3 (Aug-2000)
Methanol	3.06E-03	lb/MMBtu	1.5E-03	6.6E-03	AP-42, Table 3.2-3 (Aug-2000)
Methylene Chloride	4.12E-05	lb/MMBtu	2.0E-05	8.9E-05	AP-42, Table 3.2-3 (Aug-2000)
Naphthalene	9.71E-05	lb/MMBtu	4.8E-05	2.1E-04	AP-42, Table 3.2-3 (Aug-2000)
PAH	1.41E-04	lb/MMBtu	7.0E-05	3.1E-04	AP-42, Table 3.2-3 (Aug-2000)
Styrene	1.19E-05	lb/MMBtu	5.9E-06	2.6E-05	AP-42, Table 3.2-3 (Aug-2000)
Toluene	5.58E-04	lb/MMBtu	2.8E-04	1.2E-03	AP-42, Table 3.2-3 (Aug-2000)
Vinyl Chloride	7.18E-06	lb/MMBtu	3.6E-06	1.6E-05	AP-42, Table 3.2-3 (Aug-2000)
Xylene	1.95E-04	lb/MMBtu	9.7E-05	4.2E-04	AP-42, Table 3.2-3 (Aug-2000)
<b>Total HAP</b>			<b>0.02</b>	<b>0.07</b>	

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

## Tank Combustor

Source Designation:	9S-COMB1 & 10S-PILOT
Pilot Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,249
Pilot Rating (MMBtu/hr)	0.05
Combustor Rating (MMBtu/hr)	8.69
Combustor Rating (scf/hr) <sup>1</sup>	5,833
Pilot Fuel Consumption (scf/hr):	40
Potential Annual Hours of Operation (hr/yr):	8,760

<sup>1</sup> Maximum gas flow rate for 48" model from Leed Enclosed Combustor Operations spec sheet

<sup>2</sup> Emissions shown below are representative of one pilot

### Enclosed Combustor Emissions

Pollutant	Emission Factors <sup>2</sup> (lb/MMBtu)	Combustor		Pilot		Total	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
NO <sub>x</sub>	0.10	0.85	3.73	4.9E-03	0.02	0.86	3.75
CO	0.08	0.72	3.13	4.1E-03	0.02	0.72	3.15
VOC	5.4E-03	---	---	2.7E-04	1.2E-03	0.00	0.00
SO <sub>2</sub>	5.9E-04	0.01	0.02	2.9E-05	1.3E-04	0.01	0.02
PM/PM <sub>10</sub>	0.01	0.06	0.28	3.7E-04	1.6E-03	0.07	0.29
CO <sub>2</sub>	117.00	1016.707	4453.175	5.84	25.59	1022.55	4478.77
CH <sub>4</sub>	2.2E-03	---	---	1.1E-04	4.8E-04	0.00	0.00
N <sub>2</sub> O	2.2E-04	1.9E-03	0.01	1.1E-05	4.8E-05	1.9E-03	0.01

<sup>2</sup> Emission factors from AP-42 Ch. 1.4 for natural gas combustion were used as they were determined to be most representative of the process. Ch. 5.3 (Natural Gas Processing) was consulted, however, factors contained there are appropriate for amine gas sweetening processes, which is not the case at the wellpad. Also, Ch. 13.5 (Industrial Flares) was consulted, but since the control device in this case is an enclosed combustor vs. an elevated flare, these factors were also determined to be inappropriate.

Combustor Maximum Loading:

$$\frac{5833 \text{ scf}}{\text{hr}} \quad | \quad \frac{\text{lb-mol}}{379.5 \text{ scf}} \quad | \quad \frac{20.51 \text{ lb}}{\text{lb-mol}} = 315.29 \text{ lb/hr}$$

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

## Tank Combustor

Source Designation:	11S-FLARE, 12S-PILOT
Pilot Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,249
Pilot Rating (MMBtu/hr)	0.07
Flare Rating (MMBtu/hr) <sup>1</sup>	26.2
Flare Rating (MMscfd) <sup>1</sup>	0.394
Flare Rating (scf/hr)	16,417
Pilot Fuel Consumption (scf/hr):	60
Potential Annual Hours of Operation (hr/yr):	8,760

<sup>1</sup> Based on Flare Design Orifice Specifications of 394 MSCFD @ 1600 Btu/scf

### Flare Emissions

Pollutant	Emission Factors <sup>2</sup> (lb/MMBtu)	Combustor		Pilot		Total	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
NO <sub>x</sub>	0.07	1.78	7.80	5.1E-03	0.02	1.79	7.83
CO	0.31	8.12	35.57	2.3E-02	0.10	8.15	35.68
VOC	6.6E-01	---	---	4.9E-02	2.2E-01	0.05	0.22
CO <sub>2</sub>	117.00	3065.329	13426.1	8.76	38.39	3074.09	13464.53
CH <sub>4</sub>	2.2E-03	---	---	1.7E-04	7.2E-04	0.00	0.00
N <sub>2</sub> O	2.2E-04	5.8E-03	0.03	1.7E-05	7.2E-05	5.8E-03	0.03

<sup>2</sup> Emission factors from AP-42 Ch. 13.5 for industrial flares were used as they were determined to be most representative of the process.

Combustor Maximum Loading:

$$\frac{16417 \text{ scf}}{\text{hr}} \quad | \quad \frac{\text{lb-mol}}{379.5 \text{ scf}} \quad | \quad \frac{0.01 \text{ lb}}{\text{lb-mol}} = 887.31 \text{ lb/hr}$$

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

## Fugitive Emissions

### Fugitive Emissions from Component Leaks

Facility Equipment Type <sup>1</sup>	Valves	Connectors	Open-Ended Lines	Pressure Relief Devices
Wellhead	8	38	0.5	0
Separators	1	6	0	0
Meters/Piping	12	45	0	0
Compressors	12	57	0	0
In-line heaters	14	65	2	1
Dehydrators	24	90	2	2

<sup>1</sup> Table W-1B to Subpart W of Part 98 — Default Average Component Counts for Major Onshore Natural Gas Production

### Fugitive VOC/Total Emissions from Component Leaks

Equipment Type	Service	Emission Factors <sup>1</sup> (kg/hr/source)	Facility Equipment Count <sup>2</sup> (units)	TOC Annual Fugitive Emissions (tpy)	Weight Fraction VOC	Weight Fraction HAP	VOC Emissions <sup>3</sup> (tpy)	HAP Emissions <sup>3</sup> (tpy)
Pumps	Light Oil	3.20E-05	12	0.00	1.00	0.03	3.7E-03	1.3E-04
Valves	Gas	4.50E-03	479	20.79	0.17	0.01	3.48	0.12
Pressure Relief Valves	Gas	8.80E-03	30	2.51	0.17	0.01	0.42	0.01
Open-Ended Lines	All	2.00E-03	33	0.64	0.17	0.01	0.11	3.6E-03
Flanges	Gas	3.90E-04	1063	4.00	0.17	0.01	0.67	0.02
Connectors	All	2.00E-04	2,126	4.10	0.17	0.01	0.69	0.02
Intermittent Pneumatic Devices <sup>4</sup>	Gas	13.5	40	---	---	---	7.14	0.24
Emission Totals:				32.05	---	---	12.51	0.42

<sup>1</sup> U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates*. Table 2-4. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). The pneumatic equipment values are from 40 CFR 98 Subpart W, Table W-1A (units of scf/hr/component). Pneumatic controller assumes operation 1/3 of the year.

<sup>2</sup> Assumes one pump for each tank and one meter per wellhead. Pressure relief valves count includes one Emergency Pressure Relief valve and one lock-down hatch for each storage tank. Pneumatic devices assume 5 per well. A 50% compliance margin is added to the component counts based on Subpart W counts.

<sup>3</sup> Potential emissions VOC/HAP (tpy) = Emission factor (kg/hr/source) \* Number of Sources \* Weight % VOC/HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

<sup>4</sup> Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) \* Molar weight of natural gas (lb/lb-mol) \* Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

## Fugitive Emissions

### Fugitive Specific HAP Emissions from Component Leaks

Equipment Type	Service	Emission Factors <sup>1</sup> (kg/hr/source)	Facility Equipment Count <sup>2</sup> (units)	TOC Annual Fugitive Emissions (tpy)	Benzene Emissions <sup>3</sup> (tpy)	Toluene Emissions <sup>3</sup> (tpy)	Ethylbenzene Emissions <sup>3</sup> (tpy)	Xylene Emissions <sup>3</sup> (tpy)	n-Hexane Emissions <sup>4</sup> (tpy)
Pumps	Light Oil	3.20E-05	12	0.00	1.7E-07	4.7E-07	<0.01	8.1E-07	1.2E-05
Valves	Gas	4.50E-03	479	20.79	9.5E-04	2.6E-03	<0.01	4.5E-03	0.06
Pressure Relief Valves	Gas	8.80E-03	30	2.51	1.1E-04	3.2E-04	<0.01	5.4E-04	0.01
Open-Ended Lines	All	2.00E-03	33	0.64	2.9E-05	8.0E-05	<0.01	1.4E-04	2.0E-03
Flanges	Gas	3.90E-04	1063	4.00	1.8E-04	5.0E-04	<0.01	8.7E-04	0.01
Connectors	All	2.00E-04	2,126	4.10	1.9E-04	5.2E-04	<0.01	8.9E-04	0.01
Intermittent Pneumatic Devices <sup>4</sup>	Gas	13.5	40	---	1.9E-03	0.01	<0.01	0.01	0.13
<b>Emission Totals:</b>				<b>32.05</b>	<b>3.4E-03</b>	<b>0.01</b>	<b>&lt;0.01</b>	<b>0.02</b>	<b>0.23</b>

<sup>1</sup> U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates*. Table 2-4. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). The pneumatic equipment values are from 40 CFR 98 Subpart W, Table W-1A (units of scf/hr/component). Pneumatic controller assumes operation 1/3 of the year.

<sup>2</sup> Assumes one pump for each tank and one meter per wellhead. Pressure relief valves count includes one Emergency Pressure Relief valve and one lock-down hatch for each storage tank. Pneumatic devices assume 5 per well. A 50% compliance margin is added to the component counts based on Subpart W counts.

<sup>3</sup> Potential emissions HAP (tpy) = Emission factor (kg/hr/source) \* Number of Sources \* Weight % HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

<sup>4</sup> Potential emissions HAP (tpy) = Gas volume vented (scf/yr) \* Molar weight of natural gas (lb/lb-mol) \* Weight % HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

### GHG Fugitive Emissions from Component Leaks

Component	Component Count	GHG Emission Factor <sup>1</sup> (scf/hr/component)	CH <sub>4</sub> Emissions <sup>2,3</sup> (tpy)	CO <sub>2</sub> Emissions <sup>2,3</sup> (tpy)	CO <sub>2</sub> e Emissions <sup>4</sup> (tpy)
Pumps	12	0.01	0.02	7.4E-05	0.44
Valves	479	0.027	1.88	0.01	47.01
Pressure Relief Devices	30	0.04	0.17	7.3E-04	4.29
Open-Ended Lines	33	0.061	0.29	1.2E-03	7.33
Flanges	1,063	0.03	4.64	0.02	116.02
Connectors	2,126	0.003	0.93	3.9E-03	23.20
Intermittent Pneumatic Devices	40	13.5	26.20	0.11	655.02
<b>Total</b>		<b>34.13</b>	<b>0.15</b>	<b>853.32</b>	

<sup>1</sup> Population emission factors for gas service in the Eastern U.S. from *Table W-1A of Subpart W - Default Whole Gas Emission Factors for Onshore Production*, 40 CFR 98, Subpart W (table W-6 for compressor). Pneumatic assumes operation 1/3 of the year.

<sup>2</sup> Calculated in accordance with Equations W-32a, W-35 and W-36 in Subpart W of 40 CFR 98. See footnote 4 above for sample calculation.

<sup>3</sup> Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) \* Molar weight of natural gas (lb/lb-mol) \* Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

Mole fractions of CH<sub>4</sub> and CO<sub>2</sub> based on gas analysis:

CH<sub>4</sub>: 78%      CO<sub>2</sub>: 0.12%

<sup>4</sup> Carbon equivalent emissions (CO<sub>2</sub>e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:

Carbon Dioxide (CO <sub>2</sub> ):	1
Methane (CH <sub>4</sub> ):	25

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

## Fugitive Emissions

Emissions from Blowdowns:

Venting Type	Number of Events	Gas Volume (scf/event)	VOC Emissions (tpy)	HAP Emissions (tpy)	CH <sub>4</sub> Emissions (tpy)	CO <sub>2</sub> Emissions (tpy)	CO <sub>2</sub> e Emissions (tpy)
GPU Blowdowns	12	1,000	0.32	0.05	0.16	0.00	3.90
Sand Trap Blowdowns	800	100	2.15	0.36	1.04	0.00	25.99
<b>Total</b>			<b>2.47</b>	<b>0.42</b>	<b>1.20</b>	<b>0.01</b>	<b>29.89</b>

**Notes:**

1. VOC and HAP emissions are based on sum of the fractions of the pollutants in the site-specific gas analysis in those classifications, and are calculated in accordance with standard conversion methodology and factors.
2. CH<sub>4</sub> and CO<sub>2</sub> emissions are based on fractions of these pollutants in the site-specific gas analysis, and are calculated in accordance with Equations W-35 and W-36 in Subpart W of 40 CFR 98.
3. GHG (CO<sub>2</sub>e) is carbon dioxide equivalent, which is the summation of CO<sub>2</sub> (GWP = 1) + CH<sub>4</sub> (GWP = 25) + N<sub>2</sub>O (GWP = 298).
4. The gas volume per event is estimated based on facility design. The number of events is conservative.

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

## Haul Roads

### Estimated Potential Road Fugitive Emissions

#### Unpaved Road Emissions

$$\text{Unpaved Roads: } E \text{ (lb/VMT)} = k(s/12)^a(W/3)^b * [(365-p)/365]$$

	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	
k Factor (lb/VMT)	4.9	1.5	0.15	AP-42 Table 13.2.2-2 (Final, 11/06)
Silt content, s	4.8	%		AP-42 Table 13.2.2-1 (11/06), for Sand and Gravel Processing
Number of Rain Days, p	150			AP-42 Figure 13.2.1-2
a	0.7	0.9	0.9	AP-42 Table 13.2.2-2 (Final, 11/06)
b	0.45	0.45	0.45	AP-42 Table 13.2.2-2 (Final, 11/06)

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy)		
								PM	PM <sub>10</sub>	PM <sub>2.5</sub>
Liquids Hauling Employee Vehicles	20 3	40 3	30 3	0.47 0.47	5,749 200	5,444 189	0 0	11.66 0.14	2.97 0.04	0.30 0.00
<b>Total Potential Emissions</b>								<b>11.80</b>	<b>3.01</b>	<b>0.30</b>

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

## Well 12386 Storage Tank

**Potential Throughput.**

Operational Hours	8,760 hrs/yr
Maximum Condensate Throughput <sup>1</sup>	0 bbl/day
Maximum Produced Water Throughput <sup>1</sup>	1,000 bbl/day

**Storage Tanks - Uncontrolled**

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	0.001	0.003	0.001	0.003
Ethane	<0.001	<0.001	<0.001	<0.001	2.2E-04	0.001	2.2E-04	0.001
Propane	6.7E-07	2.9E-06	2.8E-08	1.2E-07	5.8E-05	2.5E-04	5.9E-05	2.6E-04
i-Butane	2.8E-08	1.2E-07	1.1E-09	5.0E-09	9.6E-06	4.2E-05	9.7E-06	4.2E-05
n-Butane	5.3E-08	2.3E-07	2.2E-09	9.6E-09	2.0E-05	8.9E-05	2.0E-05	9.0E-05
i-Pentane	3.7E-09	1.6E-08	1.5E-10	6.7E-10	5.5E-06	2.4E-05	5.5E-06	2.4E-05
n-Pentane	3.3E-10	1.5E-09	1.4E-11	6.0E-11	1.7E-06	7.2E-06	1.7E-06	7.2E-06
Hexane	9.5E-11	4.2E-10	3.9E-12	1.7E-11	2.4E-06	1.1E-05	2.4E-06	1.1E-05
<b>Total VOC Emissions:</b>	7.53E-07	3.30E-06	3.11E-08	1.36E-07	9.75E-05	4.27E-04	9.83E-05	4.31E-04
<b>Total HAP Emissions:</b>	9.50E-11	4.16E-10	3.92E-12	1.72E-11	2.44E-06	1.07E-05	2.44E-06	1.07E-05

<sup>1</sup> Uncontrolled emissions calculation using Promax (sum of produced water). Non-methane emissions are taken from the tank emissions stencil. Methane emissions are taken from the flash stream composition. Produced Water throughputs are based on engineering estimates.

Company Name:  
Facility Name:  
Project Description:

CNX Gas Company LLC  
SHR3/40  
G70-D Application

## Gas Analysis

Sample Location: SHL 3-B  
Sample Date: 11/13/2012  
HHV (Btu/scf): 1,249

Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.122	44.01	0.05	0.00	0.261
Nitrogen	0.343	28.01	0.10	0.00	0.468
Methane	78.499	16.04	12.59	0.61	61.386
Ethane	14.428	30.07	4.34	0.21	21.152
Propane	4.265	44.10	1.88	0.09	9.169
Isobutane	0.506	58.12	0.29	0.01	1.433
n-Butane	1.017	58.12	0.59	0.03	2.883
Isopentane	0.252	72.15	0.18	0.01	0.885
n-Pentane	0.244	72.15	0.18	0.01	0.858
Cyclopentane	<0.001	70.1	0.0	0.0	0.000
Methylcyclopentane	0.009	84.2	0.0	0.0	0.037
i-hexane	0.097	86.2	0.1	0.0	0.408
neohexane	0.023	86.2	0.0	0.0	0.095
n-Hexane	0.074	86.18	0.06	0.00	0.311
Cyclohexane	0.007	84.16	0.01	0.00	0.028
Other Hexanes	<0.001	86.18	0.00	0.00	0.000
1t,2-Dimethylcyclopentane	0.001	98.19	0.00	0.00	0.004
1c,2-Dimethylcyclopentane	0.000	98.19	0.00	0.00	0.001
Methylcyclohexane	0.012	98.19	0.01	0.00	0.056
i-heptane	0.047	100.21	0.05	0.00	0.230
n-heptane	0.022	100.21	0.02	0.00	0.106
i-octane	0.022	114.23	0.03	0.00	0.123
Benzene*	0.001	78.11	0.00	0.00	0.005
Toluene*	0.003	92.14	0.00	0.00	0.013
Ethylbenzene*	<0.001	106.17	0.00	0.00	0.000
Xylenes*	0.004	106.16	0.00	0.00	0.022
ethylcyclohexane	0.001	112.22	0.00	0.00	0.003
C8 + Heavies	0.010	130.80	0.01	0.00	0.066
Totals	100.01		20.51	1.00	100

TOC (Total)	99.54	99.27
VOC (Total)	6.62	16.73
HAP (Total)	0.12	0.57



**COMPRESSCO®**

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CPE-GJNE-002

Version 2.1

## GJ230 Natural Gas Engine Performance W/O Emission Control Package

Maximum Engine Speed (RPM)	2000	Fuel	Nat Gas
Compression Ratio	10:1	Ignition System	CD
Bore	4.360 in. (110.74mm)	Fuel System	NG IMPCO
Stroke	3.850 in. (97.79mm)	Jacket Water Outlet Temperature	180°F (82.2°C)
Displacement	230 c.i. (3.8L)	Minimum Fuel Pressure (psig)	2 oz.

Engine Rating Data	% Load	100%	50%	10%
Engine Power	bhp	46 (34.3kw)	26 (19.39kw)	10 (7.46 kw)

Engine Data				
Specific Fuel Consumption (BSFC)	Btu/bhp-hr	10,777	10,379	9,914
Intake Manifold Pressure	"Hg	-0.8	-8.9	-12.3
Timing	°BTDC	38	38	38
Exhaust Stack Temperature	°F	960	N/A	N/A
Stack Flow Rate	SCF/hr	3965.27	N/A	N/A

Engine Emissions Data	% Load	g/bhp-hr	lb/hr	TPY
Nitros Oxides (NOx)	100	16.47	1.67	7.31
Carbon Monoxide (CO)	100	18.62	1.89	8.27
Volatile Organic Compounds (VOC)	100	0.54	0.06	0.24
CO2	100	(avg %)		10.16%

Test Gas Data				
Methane	94.827 %	Btu	1014.8	

CGJ230 FI Low Pressure				
Displacement	230 c.i. (3.8L)	Maximum Discharge Pressure	125 psig (861.8kPaG)	
Bore	4.360 in. (110.74mm)	Maximum Suction Pressure	12 psig (82.7kPaG)	
Stroke	3.850 in. (97.79mm)	Maximum Compression Ratio	18: 1	
Number of Throws	4	Valves	Concentric	
Compression on Head End Only				

CGJ170 MP Medium Pressure				
Displacement	170 c.i. (2.8L)	Maximum Discharge Pressure	450 psig (3447kPaG)	
Bore	3.750 in. (95.25mm)	Maximum Suction Pressure	60 psig (413.7kPaG)	
Stroke	3.850 in. (97.79mm)	Maximum Compression Ratio	18: 1	
Number of Throws	4	Valves	Concentric	
Compression on Head End Only				

Effective Date-8-1-2014	Supercedes: All Previous
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**GJ230**

## Natural Gas Engine Performance With Emission Control Package

Maximum Engine Speed (RPM)	2000	Fuel	Nat Gas
Compression Ratio	10:1	Ignition System	CD
Bore	4.360 in. (110.74mm)	Fuel System	NG IMPCO
Stroke	3.850 in. (97.79mm)	Jacket Water Outlet Temperature	180°F (82.2°C)
Displacement	230 c.i. (3.8L)	Minimum Fuel Pressure (psig)	2 oz.

Engine Rating Data	% Load	100%	50%	10%
Engine Power	bhp	46 (34.3kw)	26 (19.39kw)	10 (7.46 kw)

Engine Data	Btu/bhp-hr	10.7775	10.3792	9.91443
Specific Fuel Consumption (BSFC)	"Hg	-0.8	-8.9	-12.3
Intake Manifold Pressure	°BTDC	38	38	38
Timing	°F	960	N/A	N/A
Exhaust Stack Temperature	SCF/hr	3965.27	N/A	N/A
Stack Flow Rate	94"			
Stack Height	2 ¼"			
Stack Diameter				

Engine Emissions Data	% Load	g/bhp-hr	lb/hr	TPY
Nitrous Oxides (NOx)	100	< 2.0	< 0.20	< 0.88
Carbon Monoxide (CO)	100	< 4.0	< 0.37	< 1.78
Volatile Organic Compounds (VOC)	100	< 1.0	< 0.14	< 0.44
CO2	100	(avg %)		11.73%

Test Gas Data				
Methane	94.827 %	Btu	1014.8	

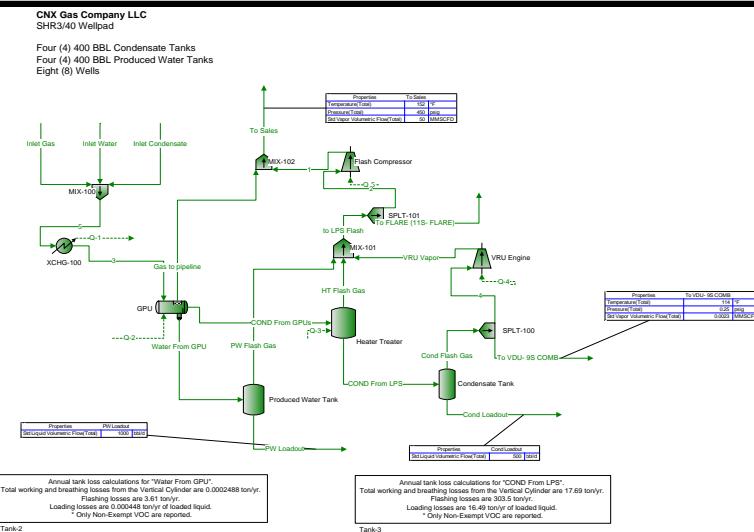
CGJ230 FI Low Pressure				
Displacement	230 c.i. (3.8L)	Maximum Discharge Pressure	125 psig (861.8kPaG)	
Bore	4.360 in. (110.74mm)	Maximum Suction Pressure	12 psig (82.7kPaG)	
Stroke	3.850 in. (97.79mm)	Maximum Compression Ratio	18: 1	
Number of Throws	4	Valves	Concentric	
		Compression on Head End Only		

CGJ170 MP Medium Pressure				
Displacement	170 c.i. (2.8L)	Maximum Discharge Pressure	450 psig (3447kPaG)	
Bore	3.750 in. (95.25mm)	Maximum Suction Pressure	60 psig (413.7kPaG)	
Stroke	3.850 in. (97.79mm)	Maximum Compression Ratio	18: 1	
Number of Throws	4	Valves	Concentric	
		Compression on Head End Only		

The GJ230 complies with 40 CFR 60 Subpart JJJJ for the current model year.

## SHR3/40 Plant Schematic

Client Name:	CNX Gas Production LLC	Job:
Location:	SHR3/40 Wellpad	
Flowsheet:	SHR3/40	



Process Streams Report All Streams Tabulated by Total Phase					
Client Name: CNX Gas Production LLC		Job:			
Location: SHR3/40 Wellpad					
Flowsheet: SHR3/40					
<b>Connections</b>					
From Block	Cond Flash Gas	COND From GPUs	COND From LPS	Cond Loadout	Gas to pipeline
Condensate Tank	GPU	Heater Treater	Condensate Tank	GPU	--
To Block	SPLT-100	Heater Treater	Condensate Tank	MIX-102	
<b>Stream Composition</b>					
Mole Fraction	Cond Flash Gas %	COND From GPUs %	COND From LPS %	Cond Loadout %	Gas to pipeline %
Water	0.842487	0.283217	0.0941076	0.0122998	0.875306
Nitrogen	0.00850567	0.0165407	0.000849761	1.28688E-05	0.332169
Carbon Dioxide	0.0805028	0.0311198	0.00876591	0.000924121	0.11851
Methane	12.3282	9.37628	1.26478	0.0553993	76.2051
Ethane	25.8673	6.79983	3.09934	0.610502	14.2738
Propane	25.2434	5.42521	4.22282	1.92499	4.45441
i-Butane	5.10555	1.35918	1.30334	0.887709	0.582757
n-Butane	12.0537	3.77613	3.82569	2.92626	1.23281
2,2-Dimethylpropane	0.0319967	0.0119656	0.0125894	0.0104679	0.00310819
i-Pentane	4.07725	2.27496	2.5166	2.346	0.381214
n-Pentane	4.40193	2.98181	3.34914	3.23406	0.407564
2,2-Dimethylbutane	0.16342	0.164198	0.188462	0.191199	0.0150764
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	0.264448	0.337729	0.391016	0.404852	0.0249825
2-Methylpentane	1.40909	1.93749	2.2479	2.33959	0.136245
3-Methylpentane	0.903174	1.36207	1.58444	1.65891	0.0875975
n-Hexane	1.97213	3.60712	4.21463	4.45976	0.200899
Methylcyclopentane	0.311864	0.559625	0.653812	0.691192	0.0299781
Benzene	0.0447815	0.0844526	0.0987598	0.10466	0.00431612
Cyclohexane	0.275515	0.6448	0.757041	0.809678	0.0277946
2-Methylhexane	0.731006	2.57357	3.03784	3.29001	0.0830216
3-Methylhexane	0.574146	2.19342	2.59131	2.81181	0.0661163
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	1.07465	5.22986	6.19179	6.75116	0.130841
Methylcyclohexane	0.614223	3.00252	3.5553	3.8768	0.0708664
Toluene	0.123773	0.689096	0.816735	0.892485	0.0143393
n-Octane	0.985954	13.6177	16.2064	17.8702	0.14731
Ethylbenzene	0.0497529	0.77467	0.922266	1.01764	0.00714989
m-Xylene	0.0622997	1.04539	1.2448	1.37406	0.00906577
o-Xylene	0.0654473	1.25037	1.48932	1.64497	0.00967883
n-Nonane	0.239505	9.3654	11.1671	12.3616	0.044237
Decane	0.0733338	7.90902	9.43706	10.4606	0.0172015
Undecane	0.0164539	4.98307	5.94742	6.59575	0.00475716
Dodecane	0.00328204	2.6465	3.15898	3.50394	0.00116509
Tridecane	0.000717102	1.54326	1.84217	2.04347	0.000320604
Tetradecane	0.000150511	0.835364	0.99718	1.10617	8.34766E-05
Pentadecane	3.27376E-05	0.48109	0.574285	0.637058	2.1895E-05
Hexadecane	6.97903E-06	0.252367	0.301255	0.334185	5.74343E-06
Heptadecane	2.13493E-06	0.178124	0.212631	0.235874	2.1447E-06
Octadecane	6.32512E-07	0.119891	0.143116	0.15876	7.66985E-07
Nonadecane	1.63753E-07	0.0777899	0.0928593	0.10301	2.45818E-07
Eicosane	3.08088E-08	0.0486271	0.0580471	0.0643924	6.13494E-08
Heneicosane	9.67729E-09	0.0324197	0.0387	0.0429305	2.28529E-08
Docosane	3.64934E-09	0.0259365	0.0309609	0.0343453	1.03471E-08
Tricosane	9.00429E-10	0.0194528	0.0232212	0.0257595	3.30343E-09
Tetracosane	2.86745E-10	0.0162108	0.0193511	0.0214664	1.32213E-09
Pentacosane	9.80552E-11	0.0129687	0.0154809	0.0171732	5.51552E-10
Hexacosane	2.68387E-11	0.00972652	0.0116107	0.0128799	1.92789E-10
Heptacosane	5.32045E-12	0.00648435	0.0077405	0.00858664	5.05517E-11
Octacosane	2.87648E-12	0.00648435	0.0077405	0.00858664	3.20599E-11
Nonacosane	1.42076E-12	0.00648435	0.0077405	0.00858664	1.88081E-11

\* User Specified Values

? Extrapolated or Approximate Values



Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Molar Flow	Cond Flash Gas lbmol/h	COND From GPUs lbmol/h	COND From LPS lbmol/h	Cond Loadout lbmol/h	Gas to pipeline lbmol/h
Hentriaccontane	9.18763E-14	0.00582285	0.00582285	0.00582285	1.8093E-09
Mass Fraction	Cond Flash Gas %	COND From GPUs %	COND From LPS %	Cond Loadout %	Gas to pipeline %
Water	0.325409	0.0531915	0.0155509	0.00191286	0.732954
Nitrogen	0.00510857	0.00483062	0.00021835	3.11205E-06	0.432514
Carbon Dioxide	0.0759596	0.0142779	0.00353862	0.000351089	0.242424
Methane	4.24029	1.56814	0.186112	0.00767216	56.8238
Ethane	16.6762	2.13157	0.85483	0.158471	19.9496
Propane	23.8654	2.49399	1.708	0.73277	9.12979
i-Butane	6.36224	0.823571	0.694849	0.445405	1.57436
n-Butane	15.0206	2.28808	2.03959	1.46824	3.33054
2,2-Dimethylpropane	0.0494947	0.00900004	0.00833153	0.00651978	0.0104235
i-Pentane	6.30698	1.71114	1.66546	1.46117	1.27842
n-Pentane	6.80922	2.24281	2.21642	2.01428	1.36679
2,2-Dimethylbutane	0.301935	0.147514	0.148969	0.142237	0.060389
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	0.488595	0.303413	0.309078	0.301177	0.100068
2-Methylpentane	2.60344	1.74063	1.77685	1.74047	0.54573
3-Methylpentane	1.66871	1.22367	1.25242	1.2341	0.350873
n-Hexane	3.64372	3.24061	3.33144	3.3177	0.804705
Methylcyclopentane	0.562722	0.491001	0.504715	0.502162	0.117269
Benzene	0.0749965	0.0687721	0.0707599	0.0705734	0.0156706
Cyclohexane	0.497133	0.565732	0.584403	0.588244	0.108727
2-Methylhexane	1.57044	2.6884	2.7921	2.84587	0.386672
3-Methylhexane	1.23346	2.29129	2.38169	2.43223	0.307936
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	2.3087	5.46322	5.69092	5.83979	0.609388
Methylcyclohexane	1.29301	3.0734	3.20197	3.28599	0.323419
Toluene	0.244508	0.661916	0.690259	0.709879	0.0614109
n-Octane	2.41466	16.2166	16.9806	17.6217	0.782138
Ethylbenzene	0.113247	0.857394	0.898106	0.932651	0.0352823
m-Xylene	0.141805	1.15702	1.21219	1.2593	0.0447365
o-Xylene	0.14897	1.3839	1.45031	1.50758	0.0477617
n-Nonane	0.65859	12.5223	13.1372	13.6865	0.264829
Decane	0.223706	11.7315	12.3162	12.8484	0.11376
Undecane	0.0551412	8.1201	8.52709	8.89997	0.0345625
Dodecane	0.0119859	4.69957	4.9356	5.15231	0.00922437
Tridecane	0.0028345	2.96614	3.11523	3.25222	0.00274736
Tetradecane	0.000640189	1.72772	1.81459	1.89443	0.000769761
Pentadecane	0.000149093	1.06535	1.11893	1.16817	0.000216174
Hexadecane	3.38825E-05	0.595758	0.625719	0.653258	6.04508E-05
Heptadecane	1.10069E-05	0.446543	0.469	0.489642	2.39717E-05
Octadecane	3.45122E-06	0.318087	0.334084	0.348789	9.07277E-06
Nonadecane	9.42741E-07	0.217763	0.228715	0.238781	3.06808E-06
Eicosane	1.86634E-07	0.143236	0.15044	0.157061	8.05707E-07
Heneicosane	6.15335E-08	0.100236	0.105277	0.109911	3.15028E-07
Docosane	2.4302E-08	0.0839839	0.0882076	0.09209	1.49381E-07
Tricosane	6.267E-09	0.0658338	0.0691447	0.0721881	4.98454E-08
Tetracosane	2.08198E-09	0.0572324	0.0601108	0.0627565	2.08115E-08
Pentacosane	7.41442E-10	0.0476825	0.0500806	0.0522848	9.04156E-09
Hexacosane	2.11012E-10	0.0371842	0.0390543	0.0407733	3.28607E-09
Heptacosane	4.34305E-11	0.0257377	0.0270321	0.0282219	8.94606E-10
Octacosane	2.43456E-11	0.0266859	0.028028	0.0292617	5.88262E-10
Nonacosane	1.24521E-11	0.0276341	0.0290239	0.0303014	3.5737E-10
Triaccontane	2.52773E-12	0.0142912	0.0150099	0.0156706	9.08953E-11
Hentriaccontane	1.74123E-11	0.0442958	0.0465236	0.0485712	6.73825E-10

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Mass Flow	Cond Flash Gas lb/h	COND From GPUs lb/h	COND From LPS lb/h	Cond Loadout lb/h	Gas to pipeline lb/h
Water	0.750063	3.05448	0.850239	0.100175	859.733
Nitrogen	0.0117752	0.277395	0.0119382	0.000162976	507.326
Carbon Dioxide	0.175086	0.819899	0.193472	0.0183864	284.356
Methane	9.77382	90.0491	10.1756	0.401787	66652.7
Ethane	38.4383	122.404	46.7374	8.29904	23400.3
Propane	55.0093	143.215	93.3841	38.3748	10709
i-Butane	14.6649	47.2929	37.9905	23.3256	1846.68
n-Butane	34.6224	131.391	111.513	76.8911	3906.63
2,2-Dimethylpropane	0.114085	0.51682	0.455522	0.341438	12.2264
i-Pentane	14.5375	98.2609	91.0581	76.5206	1499.55
n-Pentane	15.6952	128.792	121.182	105.487	1603.2
2,2-Dimethylbutane	0.695956	8.47088	8.14482	7.44887	70.8344
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	1.12621	17.4233	16.8987	15.7725	117.376
2-Methylpentane	6.0009	99.9542	97.1483	91.1474	640.125
3-Methylpentane	3.84634	70.2685	68.4754	64.629	411.564
n-Hexane	8.39872	186.09	182.145	173.746	943.895
Methylcyclopentane	1.29707	28.1953	27.5951	26.298	137.553
Benzene	0.172866	3.94919	3.86876	3.6959	18.3812
Cyclohexane	1.14589	32.4867	31.952	30.8061	127.534
2-Methylhexane	3.61985	154.38	152.657	149.037	453.554
3-Methylhexane	2.8431	131.576	130.218	127.375	361.199
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	5.32153	313.721	311.149	305.827	714.794
Methylcyclohexane	2.98037	176.488	175.066	172.086	379.361
Toluene	0.563587	38.01	37.7396	37.176	72.0332
n-Octane	5.56576	931.228	928.405	922.839	917.425
Ethylbenzene	0.261032	49.2352	49.1035	48.8425	41.385
m-Xylene	0.326859	66.4412	66.276	65.9492	52.4745
o-Xylene	0.343374	79.4692	79.2948	78.9515	56.023
n-Nonane	1.51804	719.082	718.273	716.754	310.636
Decane	0.51564	673.674	673.381	672.866	133.437
Undecane	0.1271	466.291	466.214	466.087	40.5407
Dodecane	0.0276274	269.869	269.852	269.824	10.8199
Tridecane	0.00653348	170.328	170.324	170.317	3.22257
Tetradecane	0.00147563	99.213	99.212	99.2105	0.902906
Pentadecane	0.000343657	61.1771	61.1768	61.1765	0.253566
Hexadecane	7.80987E-05	34.211	34.2109	34.2108	0.070907
Heptadecane	2.53707E-05	25.6424	25.6423	25.6423	0.0281181
Octadecane	7.95501E-06	18.2659	18.2659	18.2659	0.0106421
Nonadecane	2.17301E-06	12.5049	12.5049	12.5049	0.00359877
Eicosane	4.3019E-07	8.22522	8.22522	8.22521	0.000945071
Heneicosane	1.41834E-07	5.75599	5.75599	5.75599	0.000369518
Docosane	5.60158E-08	4.82271	4.82271	4.82271	0.000175219
Tricosane	1.44453E-08	3.78045	3.78045	3.78045	5.84672E-05
Tetracosane	4.79893E-09	3.28653	3.28653	3.28653	2.44113E-05
Pentacosane	1.70901E-09	2.73813	2.73813	2.73813	1.06055E-05
Hexacosane	4.86379E-10	2.13528	2.13528	2.13528	3.85446E-06
Heptacosane	1.00107E-10	1.47797	1.47797	1.47797	1.04935E-06
Octacosane	5.61163E-11	1.53242	1.53242	1.53242	6.90014E-07
Nonacosane	2.87018E-11	1.58687	1.58687	1.58687	4.19184E-07
Triacontane	5.82637E-12	0.82066	0.82066	0.82066	1.06617E-07
Hentriacontane	4.01352E-11	2.54365	2.54365	2.54365	7.90376E-07
Volumetric Flow	Cond Flash Gas ft^3/h	COND From GPUs gpm	COND From LPS gpm	Cond Loadout gpm	Gas to pipeline ft^3/h
Water	17.1971	-0.00385327	-0.00150006	-0.000198901	625.867
Nitrogen	0.174907	0.00119884	4.34564E-05	5.44897E-07	268.012
Carbon Dioxide	1.63959	0.00139338	0.00026139	2.19611E-05	82.838

\* User Specified Values

? Extrapolated or Approximate Values

		Process Streams Report All Streams Tabulated by Total Phase				
Client Name:	CNX Gas Production LLC				Job:	
Location:	SHR3/40 Wellpad					
Flowsheet:	SHR3/40					
Volumetric Flow		Cond Flash Gas ft <sup>3</sup> /h	COND From GPUs gpm	COND From LPS gpm	Cond Loadout gpm	Gas to pipeline ft <sup>3</sup> /h
Methane		252.049	0.673738	0.0660299	0.00243035	56731.7
Ethane		523.298	0.590252	0.205884	0.0349591	9155.81
Propane		506.282	0.59081	0.363474	0.145055	2514.63
i-Butane		101.643	0.180194	0.139154	0.0837047	290.701
n-Butane		239.598	0.484357	0.395679	0.26739	596.892
2,2-Dimethylpropane		0.6332	0.00186578	0.00159935	0.00118087	1.39654
i-Pentane		80.4509	0.337598	0.304809	0.252446	152.239
n-Pentane		86.7379	0.438455	0.402011	0.344886	164.506
2,2-Dimethylbutane		3.20398	0.0277612	0.026245	0.023752	5.66763
Cyclopentane		0	0	0	0	0
2,3-Dimethylbutane		5.17667	0.0559172	0.0533655	0.0493005	9.02267
2-Methylpentane		27.5572	0.324637	0.309957	0.287646	48.3986
3-Methylpentane		17.6599	0.224552	0.215177	0.200953	30.8157
n-Hexane		38.4849	0.597114	0.574314	0.541894	66.5546
Methylcyclopentane		6.10975	0.079245	0.0765393	0.0722473	10.7962
Benzene		0.880903	0.0092494	0.00893179	0.00843914	1.6151
Cyclohexane		5.39721	0.0871311	0.084918	0.0812156	9.44174
2-Methylhexane		14.1695	0.478985	0.467937	0.452997	23.0896
3-Methylhexane		11.1296	0.402933	0.394326	0.382599	18.3118
2,2,4-Trimethylpentane		0	0	0	0	0
n-Heptane		20.7903	0.967053	0.948201	0.924345	33.1825
Methylcyclohexane		11.9355	0.476398	0.47111	0.460704	20.0946
Toluene		2.41232	0.0894132	0.088303	0.0863944	4.31143
n-Octane		18.8977	2.75945	2.73115	2.69744	27.2801
Ethylbenzene		0.961051	0.115333	0.11511	0.114044	1.50672
m-Xylene		1.20229	0.15605	0.155596	0.154138	1.83693
o-Xylene		1.2632	0.18183	0.181889	0.180492	1.94356
n-Nonane		4.54253	2.06704	2.05622	2.0416	4.39184
Decane		1.37777	1.89711	1.89311	1.88422	0.0386789
Undecane		0.306148	1.28844	1.28807	1.28354	-0.186757
Dodecane		0.0604346	0.735515	0.736462	0.73449	-0.1393
Tridecane		0.0130731	0.460945	0.461805	0.460725	-0.0609168
Tetradecane		0.00271518	0.265134	0.265742	0.265182	-0.0222036
Pentadecane		0.000585416	0.162353	0.162772	0.162457	-0.00731946
Hexadecane		0.00012347	0.0903174	0.0905617	0.0903946	-0.00235549
Heptadecane		3.73264E-05	0.0668637	0.0670673	0.0669551	-0.00105192
Octadecane		1.09666E-05	0.0472773	0.0474488	0.0473823	-0.000422972
Nonadecane		2.80942E-06	0.0322777	0.0323838	0.0323351	-0.000153789
Eicosane		5.22406E-07	0.0212107	0.0212643	0.0212264	-4.35638E-05
Heneicosane		1.62475E-07	0.0148655	0.0148975	0.0148691	-1.77737E-05
Docosane		6.06306E-08	0.0123597	0.012383	0.0123584	-8.77614E-06
Tricosane		1.47812E-08	0.00974822	0.0097624	0.00974149	-3.0797E-06
Tetracosane		4.65272E-09	0.00856075	0.00856183	0.00853928	-1.33694E-06
Pentacosane		1.57494E-09	0.00708003	0.00707803	0.00705832	-5.95955E-07
Hexacosane		4.25495E-10	0.00558897	0.00558169	0.00556402	-2.24843E-07
Heptacosane		8.32786E-11	0.00388923	0.00388008	0.00386621	-6.33986E-08
Octacosane		4.45423E-11	0.00399561	0.00398491	0.0039702	-4.23456E-08
Nonacosane		2.17797E-11	0.00412528	0.00411228	0.00409638	-2.60584E-08
Triacontane		4.22178E-12	0.00214111	0.0021327	0.00212383	-6.77572E-09
Hentriacontane		2.63647E-11	0.00723674	0.0071905	0.0071541	-5.98743E-08

### Stream Properties

Property	Units	Cond Flash Gas	COND From GPUs	COND From LPS	Cond Loadout	Gas to pipeline
Temperature	°F	113.607	150	125	113.607	150 *
Pressure	psia	14.9459	*	464.696	84.6959	464.696 *
Mole Fraction Vapor	%	100	0	0	0	100
Mole Fraction Light Liquid	%	0	100	100	100	0
Mole Fraction Heavy Liquid	%	0	0	0	0	0

Process Streams Report All Streams Tabulated by Total Phase						
Client Name:	CNX Gas Production LLC			Job:		
Location:	SHR3/40 Wellpad					
Flowsheet:	SHR3/40					
Stream Properties						
Property	Units	Cond Flash Gas	COND From GPUs	COND From LPS	Cond Loadout	Gas to pipeline
Molecular Weight	lb/lbmol	46.6417	95.9218	109.021	115.84	21.5142
Mass Density	lb/ft^3	0.115063	40.8102	42.6489	43.469	1.65434
Molar Flow	lbmol/h	4.9419	59.8656	50.1505	45.2086	5452.08
Mass Flow	lb/h	230.499	5742.42	5467.45	5236.95	117297
Vapor Volumetric Flow	ft^3/h	2003.24	140.71	128.197	120.476	70902.5
Liquid Volumetric Flow	gpm	249.755	17.5431	15.983	15.0203	8839.79
Std Vapor Volumetric Flow	MMSCFD	0.0450089	0.545233	0.456751	0.411743	49.6555
Std Liquid Volumetric Flow	sgpm	0.900853	16.8566	15.4838	14.5829	668.545
Compressibility		0.98477	0.16694	0.0345057	0.00647401	0.923655
Specific Gravity		1.61041	0.654335	0.683815	0.696965	0.742826
API Gravity			70.1987	66.3084	64.4704	
Enthalpy	Btu/h	-233599	-5.13071E+06	-4.81016E+06	-4.57656E+06	-1.88891E+08
Mass Enthalpy	Btu/lb	-1013.45	-893.474	-879.78	-873.897	-1610.36
Mass Cp	Btu/(lb*°F)	0.428095	0.56404	0.538455	0.527362	0.558267
Ideal Gas CpCv Ratio		1.11123	1.05043	1.04604	1.04406	1.22164
Dynamic Viscosity	cP	0.00881636	0.272147	0.372234	0.442842	0.012407
Kinematic Viscosity	cSt	4.78336	0.416307	0.544863	0.635986	0.468189
Thermal Conductivity	Btu/(h*ft*°F)	0.0120868	0.0645413 ?	0.0676809 ?	0.0696762 ?	0.0217677
Surface Tension	lbf/ft		0.000885326	0.00120213	0.00131585	
Net Ideal Gas Heating Value	Btu/ft^3	2424.97	4859.62	5509.35	5846.52	1166.96
Net Liquid Heating Value	Btu/lb	19565.2	19050	18998.9	18974	20508.5
Gross Ideal Gas Heating Value	Btu/ft^3	2633.46	5237.97	5933.27	6293.99	1285.8
Gross Liquid Heating Value	Btu/lb	21260.7	20545.3	20472.9	20438.2	22604.5
Remarks						

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Connections					
	HT Flash Gas	Inlet Condensate	Inlet Gas	Inlet Water	PW Flash Gas
From Block	Heater Treater	--	--	--	Produced Water Tank
To Block	MIX-101	MIX-100	MIX-100	MIX-100	MIX-101
Stream Composition					
Mole Fraction	HT Flash Gas %	Inlet Condensate %	Inlet Gas %	Inlet Water %	PW Flash Gas %
Water	1.25942	0 *	0.000100023 *	100 *	25.6001
Nitrogen	0.097539	0.0229933 *	0.34298 *	0 *	0.142164
Carbon Dioxide	0.146512	0.0339901 *	0.121829 *	0 *	0.935507
Methane	51.2486	11.6216 *	78.5178 *	0 *	59.1
Ethane	25.9021	11.2068 *	14.4316 *	0 *	10.8726
Propane	11.6321	10.9688 *	4.2658 *	0 *	2.12436
i-Butane	1.64742	3.04812 *	0.506018 *	0 *	0.126414
n-Butane	3.52026	8.16363 *	1.01754 *	0 *	0.493013
2,2-Dimethylpropane	0.00874516	0.0909736 *	0 *	0 *	0.000408756
i-Pentane	1.02759	4.57267 *	0.251759 *	0 *	0.0751823
n-Pentane	1.08564	5.74233 *	0.243957 *	0 *	0.0559807
2,2-Dimethylbutane	0.0389455	0.245929 *	0.00840197 *	0 *	0.00104497
Cyclopentane	0	0 *	0 *	0 *	0
2,3-Dimethylbutane	0.0626554	0.460866 *	0.012703 *	0 *	0.00305862
2-Methylpentane	0.335154	2.80519 *	0.0596139 *	0 *	0.0178212
3-Methylpentane	0.214179	1.86446 *	0.0374088 *	0 *	0.0243902
n-Hexane	0.471143	4.74462 *	0.0740173 *	0 *	0.0148177
Methylcyclopentane	0.0734177	0.772776 *	0.00890208 *	0 *	0.0127145
Benzene	0.0105978	0.114967 *	0.00120028 *	0 *	0.0455132
Cyclohexane	0.0654012	0.79477 *	0.00680159 *	0 *	0.0221574
2-Methylhexane	0.176962	2.45429 *	0.0247058 *	0 *	0.00375844
3-Methylhexane	0.139476	2.0524 *	0.0177041 *	0 *	0.00319634
2,2,4-Trimethylpentane	0	0 *	0 *	0 *	0
n-Heptane	0.264299	4.69764 *	0.0217051 *	0 *	0.0050562
Methylcyclohexane	0.149024	2.59825 *	0.0117027 *	0 *	0.0235206
Toluene	0.0302099	0.539843 *	0.00280066 *	0 *	0.122022
n-Octane	0.254395	8.18363 *	0.00560131 *	0 *	0.00280361
Ethylbenzene	0.0127655	0.439872 *	0 *	0 *	0.0453218
m-Xylene	0.0160166	0.503854 *	0.00270063 *	0 *	0.0517287
o-Xylene	0.0169033	0.657809 *	0 *	0 *	0.0748939
n-Nonane	0.0649993	4.07282 *	0.00230054 *	0 *	0.000338012
Decane	0.0211562	2.87017 *	0.00190044 *	0 *	4.23619E-05
Undecane	0.00503447	1.65652 *	0.000500117 *	0 *	5.65706E-06
Dodecane	0.00105849	0.848754 *	0 *	0 *	2.83988E-06
Tridecane	0.000246184	0.484859 *	0 *	0 *	1.39354E-06
Tetradecane	5.47007E-05	0.259925 *	0 *	0 *	6.18273E-07
Pentadecane	1.24886E-05	0.148957 *	0 *	0 *	2.83911E-07
Hexadecane	2.81159E-06	0.0779774 *	0 *	0 *	1.34429E-07
Heptadecane	9.05203E-07	0.0549841 *	0 *	0 *	9.15072E-08
Octadecane	2.82336E-07	0.0369893 *	0 *	0 *	5.54099E-08
Nonadecane	7.74071E-08	0.023993 *	0 *	0 *	3.24792E-08
Eicosane	1.57551E-08	0.0149957 *	0 *	0 *	1.63448E-08
Heneicosane	5.17289E-09	0.0099971 *	0 *	0 *	9.11768E-09
Docosane	2.04697E-09	0.00799768 *	0 *	0 *	6.51384E-09
Tricosane	5.41938E-10	0.00599826 *	0 *	0 *	3.42273E-09
Tetracosane	1.83601E-10	0.00499855 *	0 *	0 *	1.67389E-09
Pentacosane	6.62551E-11	0.00399884 *	0 *	0 *	7.49094E-10
Hexacosane	1.9373E-11	0.00299913 *	0 *	0 *	2.5401E-10
Heptacosane	4.1492E-12	0.00199942 *	0 *	0 *	6.14941E-11
Octacosane	2.3384E-12	0.00199942 *	0 *	0 *	3.5227E-11
Nonacosane	1.20935E-12	0.00199942 *	0 *	0 *	1.86567E-11

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Stream Composition					
Mole Fraction	HT Flash Gas %	Inlet Condensate %	Inlet Gas %	Inlet Water %	PW Flash Gas %
Triacontane	2.52281E-13	0.00099971 *	0 *	0 *	4.0571E-12
Hentriacontane	1.58644E-12	0.00299913 *	0 *	0 *	0
Molar Flow	HT Flash Gas lbmol/h	Inlet Condensate lbmol/h	Inlet Gas lbmol/h	Inlet Water lbmol/h	PW Flash Gas lbmol/h
Water	0.122354	0 *	0.00527155 *	857.842 *	0.134705
Nitrogen	0.00947606	0.0446419 *	18.0761 *	0 *	0.00074805
Carbon Dioxide	0.0142339	0.0659923 *	6.42075 *	0 *	0.00492252
Methane	4.97888	22.5636 *	4138.13 *	0 *	0.310976
Ethane	2.51643	21.7581 *	760.59 *	0 *	0.0572102
Propane	1.13007	21.2961 *	224.821 *	0 *	0.0111781
i-Butane	0.160049	5.91796 *	26.6688 *	0 *	0.000665173
n-Butane	0.341999	15.8498 *	53.6275 *	0 *	0.00259417
2,2-Dimethylpropane	0.000849606	0.176627 *	0 *	0 *	2.15082E-06
i-Pentane	0.0998321	8.87791 *	13.2685 *	0 *	0.000395599
n-Pentane	0.105472	11.1488 *	12.8573 *	0 *	0.000294563
2,2-Dimethylbutane	0.00378361	0.477474 *	0.44281 *	0 *	5.4985E-06
Cyclopentane	0	0 *	0 *	0 *	0
2,3-Dimethylbutane	0.00608707	0.894778 *	0.669487 *	0 *	1.60941E-05
2-Methylpentane	0.0325607	5.44631 *	3.14184 *	0 *	9.37729E-05
3-Methylpentane	0.0208078	3.61987 *	1.97156 *	0 *	0.000128338
n-Hexane	0.0457722	9.21175 *	3.90095 *	0 *	7.79686E-05
Methylcyclopentane	0.00713264	1.50035 *	0.469168 *	0 *	6.6902E-05
Benzene	0.00102959	0.223209 *	0.0632586 *	0 *	0.000239484
Cyclohexane	0.00635383	1.54306 *	0.358465 *	0 *	0.000116589
2-Methylhexane	0.0171921	4.76503 *	1.30207 *	0 *	1.97764E-05
3-Methylhexane	0.0135503	3.98477 *	0.933064 *	0 *	1.68187E-05
2,2,4-Trimethylpentane	0	0 *	0 *	0 *	0
n-Heptane	0.0256771	9.12053 *	1.14393 *	0 *	2.66051E-05
Methylcyclohexane	0.0144779	5.04453 *	0.616771 *	0 *	0.000123762
Toluene	0.00293494	1.04811 *	0.147603 *	0 *	0.000642066
n-Octane	0.0247149	15.8886 *	0.295207 *	0 *	1.47522E-05
Ethylbenzene	0.00124019	0.854018 *	0 *	0 *	0.000238477
m-Xylene	0.00155604	0.978239 *	0.142332 *	0 *	0.00027219
o-Xylene	0.00164218	1.27715 *	0 *	0 *	0.000394082
n-Nonane	0.00631479	7.90743 *	0.121246 *	0 *	1.77858E-06
Decane	0.00205535	5.57247 *	0.100159 *	0 *	2.22903E-07
Undecane	0.000489107	3.21616 *	0.0263577 *	0 *	2.97667E-08
Dodecane	0.000102834	1.64787 *	0 *	0 *	1.49431E-08
Tridecane	2.39172E-05	0.941361 *	0 *	0 *	7.33261E-09
Tetradecane	5.31426E-06	0.504647 *	0 *	0 *	3.25327E-09
Pentadecane	1.21329E-06	0.289202 *	0 *	0 *	1.4939E-09
Hexadecane	2.73151E-07	0.151394 *	0 *	0 *	7.07347E-10
Heptadecane	8.79419E-08	0.106752 *	0 *	0 *	4.81499E-10
Octadecane	2.74293E-08	0.0718152 *	0 *	0 *	2.9156E-10
Nonadecane	7.52022E-09	0.0465828 *	0 *	0 *	1.70901E-10
Eicosane	1.53064E-09	0.0291143 *	0 *	0 *	8.60042E-11
Heneicosane	5.02555E-10	0.0194095 *	0 *	0 *	4.7976E-11
Docosane	1.98866E-10	0.0155276 *	0 *	0 *	3.4275E-11
Tricosane	5.26501E-11	0.0116457 *	0 *	0 *	1.801E-11
Tetracosane	1.78372E-11	0.00970475 *	0 *	0 *	8.80781E-12
Pentacosane	6.43678E-12	0.0077638 *	0 *	0 *	3.94164E-12
Hexacosane	1.88212E-12	0.00582285 *	0 *	0 *	1.33657E-12
Heptacosane	4.03101E-13	0.0038819 *	0 *	0 *	3.23574E-13
Octacosane	2.27179E-13	0.0038819 *	0 *	0 *	1.8536E-13
Nonacosane	1.1749E-13	0.0038819 *	0 *	0 *	9.81689E-14
Triacontane	2.45095E-14	0.00194095 *	0 *	0 *	2.13479E-14

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Molar Flow	HT Flash Gas lbmol/h	Inlet Condensate lbmol/h	Inlet Gas lbmol/h	Inlet Water lbmol/h	PW Flash Gas lbmol/h
Hentriacontane	1.54125E-13	0.00582285 *	0 *	0 *	0
Mass Fraction	HT Flash Gas %	Inlet Condensate %	Inlet Gas %	Inlet Water %	PW Flash Gas %
Water	0.801623	0 *	8.79717E-05 *	100 *	23.4621
Nitrogen	0.0965393	0.00878719 *	0.469067 *	0 *	0.2026
Carbon Dioxide	0.227814	0.0204071 *	0.261755 *	0 *	2.09448
Methane	29.0478	2.54343 *	61.4949 *	0 *	48.2328
Ethane	27.5178	4.59708 *	21.1852 *	0 *	16.6317
Propane	18.1223	6.59839 *	9.18324 *	0 *	4.76549
i-Butane	3.38303	2.41689 *	1.43585 *	0 *	0.373783
n-Butane	7.22898	6.47304 *	2.88731 *	0 *	1.45775
2,2-Dimethylpropane	0.0222924	0.089542 *	0 *	0 *	0.00150029
i-Pentane	2.61945	4.50072 *	0.886776 *	0 *	0.275949
n-Pentane	2.76743	5.65197 *	0.859296 *	0 *	0.205471
2,2-Dimethylbutane	0.118577	0.289118 *	0.035348 *	0 *	0.00458111
Cyclopentane	0	0 *	0 *	0 *	0
2,3-Dimethylbutane	0.190766	0.541802 *	0.0534427 *	0 *	0.0134089
2-Methylpentane	1.02044	3.29782 *	0.250802 *	0 *	0.0781275
3-Methylpentane	0.65211	2.19189 *	0.157383 *	0 *	0.106926
n-Hexane	1.43448	5.57786 *	0.311399 *	0 *	0.0649601
Methylcyclopentane	0.218305	0.887236 *	0.0365759 *	0 *	0.054436
Benzene	0.0292478	0.12251 *	0.0045772 *	0 *	0.180858
Cyclohexane	0.194468	0.912487 *	0.0279456 *	0 *	0.0948648
2-Methylhexane	0.626494	3.35494 *	0.120858 *	0 *	0.0191588
3-Methylhexane	0.493782	2.80557 *	0.0866066 *	0 *	0.0162934
2,2,4-Trimethylpentane	0	0 *	0 *	0 *	0
n-Heptane	0.93569	6.42152 *	0.106179 *	0 *	0.0257741
Methylcyclohexane	0.516972	3.48027 *	0.0560967 *	0 *	0.117485
Toluene	0.0983445	0.678564 *	0.012598 *	0 *	0.571958
n-Octane	1.0267	12.7527 *	0.0312366 *	0 *	0.0162921
Ethylbenzene	0.0478828	0.637075 *	0 *	0 *	0.244778
m-Xylene	0.0600776	0.729741 *	0.0139974 *	0 *	0.279381
o-Xylene	0.0634035	0.952717 *	0 *	0 *	0.404493
n-Nonane	0.29454	7.12611 *	0.0144047 *	0 *	0.00220542
Decane	0.106352	5.57107 *	0.0132009 *	0 *	0.000306625
Undecane	0.0278033	3.53233 *	0.0038164 *	0 *	4.49838E-05
Dodecane	0.00637014	1.97228 *	0 *	0 *	2.46086E-05
Tridecane	0.00160358	1.21946 *	0 *	0 *	1.30699E-05
Tetradecane	0.000383415	0.70347 *	0 *	0 *	6.23993E-06
Pentadecane	9.37256E-05	0.431645 *	0 *	0 *	3.06796E-06
Hexadecane	2.24941E-05	0.240883 *	0 *	0 *	1.54857E-06
Heptadecane	7.69065E-06	0.180375 *	0 *	0 *	1.11943E-06
Octadecane	2.53866E-06	0.128421 *	0 *	0 *	7.1738E-07
Nonadecane	7.34377E-07	0.0878913 *	0 *	0 *	4.43678E-07
Eicosane	1.5728E-07	0.0578015 *	0 *	0 *	2.34939E-07
Heneicosane	5.42034E-08	0.0404473 *	0 *	0 *	1.37563E-07
Docosane	2.24633E-08	0.0338882 *	0 *	0 *	1.02926E-07
Tricosane	6.21576E-09	0.026564 *	0 *	0 *	5.65251E-08
Tetracosane	2.19681E-09	0.0230931 *	0 *	0 *	2.88382E-08
Pentacosane	8.25582E-10	0.0192397 *	0 *	0 *	1.34401E-08
Hexacosane	2.51002E-10	0.0150037 *	0 *	0 *	4.73864E-09
Heptacosane	5.58143E-11	0.010385 *	0 *	0 *	1.19107E-09
Octacosane	3.26146E-11	0.0107676 *	0 *	0 *	7.07446E-10
Nonacosane	1.74666E-11	0.0111502 *	0 *	0 *	3.87984E-10
Triacontane	3.76872E-12	0.00576641 *	0 *	0 *	8.72666E-11
Hentriacontane	2.44854E-11	0.0178731 *	0 *	0 *	0

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Mass Flow	HT Flash Gas lb/h	Inlet Condensate lb/h	Inlet Gas lb/h	Inlet Water lb/h	PW Flash Gas lb/h
Water	2.20424	0 *	0.0949684 *	15454.3 *	2.42674
Nitrogen	0.265457	1.25057 *	506.374 *	0 *	0.0209554
Carbon Dioxide	0.626427	2.90429 *	282.574 *	0 *	0.216637
Methane	79.8735	361.975 *	66385.8 *	0 *	4.98883
Ethane	75.6665	654.244 *	22870.2 *	0 *	1.72026
Propane	49.8314	939.065 *	9913.62 *	0 *	0.492905
i-Butane	9.30241	343.965 *	1550.05 *	0 *	0.0386613
n-Butane	19.8777	921.225 *	3116.95 *	0 *	0.150779
2,2-Dimethylpropane	0.061298	12.7434 *	0 *	0 *	0.000155179
i-Pentane	7.20276	640.53 *	957.305 *	0 *	0.028542
n-Pentane	7.60968	804.374 *	927.639 *	0 *	0.0212524
2,2-Dimethylbutane	0.326054	41.1465 *	38.1593 *	0 *	0.000473835
Cyclopentane	0	0 *	0 *	0 *	0
2,3-Dimethylbutane	0.524555	77.1078 *	57.6933 *	0 *	0.00138691
2-Methylpentane	2.80593	469.338 *	270.749 *	0 *	0.00808091
3-Methylpentane	1.79312	311.944 *	169.9 *	0 *	0.0110596
n-Hexane	3.94444	793.826 *	336.165 *	0 *	0.00671897
Methylcyclopentane	0.60028	126.269 *	39.4849 *	0 *	0.00563044
Benzene	0.0804235	17.4353 *	4.94124 *	0 *	0.0187066
Cyclohexane	0.534735	129.863 *	30.1683 *	0 *	0.00981209
2-Methylhexane	1.72269	477.466 *	130.47 *	0 *	0.00198164
3-Methylhexane	1.35777	399.282 *	93.4948 *	0 *	0.00168527
2,2,4-Trimethylpentane	0	0 *	0 *	0 *	0
n-Heptane	2.57289	913.894 *	114.624 *	0 *	0.00266588
Methylcyclohexane	1.42153	495.303 *	60.5583 *	0 *	0.0121517
Toluene	0.270421	96.5715 *	13.5999 *	0 *	0.059159
n-Octane	2.82314	1814.93 *	33.721 *	0 *	0.00168513
Ethylbenzene	0.131665	90.6668 *	0 *	0 *	0.0253179
m-Xylene	0.165197	103.855 *	15.1107 *	0 *	0.028897
o-Xylene	0.174342	135.588 *	0 *	0 *	0.0418377
n-Nonane	0.809903	1014.17 *	15.5504 *	0 *	0.000228111
Decane	0.292439	792.86 *	14.2509 *	0 *	3.1715E-05
Undecane	0.0764514	502.712 *	4.11993 *	0 *	4.65278E-06
Dodecane	0.0175162	280.689 *	0 *	0 *	2.54532E-06
Tridecane	0.0044094	173.551 *	0 *	0 *	1.35185E-06
Tetradecane	0.00105429	100.116 *	0 *	0 *	6.4541E-07
Pentadecane	0.00025772	61.4306 *	0 *	0 *	3.17327E-07
Hexadecane	6.18525E-05	34.2819 *	0 *	0 *	1.60172E-07
Heptadecane	2.11472E-05	25.6705 *	0 *	0 *	1.15785E-07
Octadecane	6.98061E-06	18.2766 *	0 *	0 *	7.42003E-08
Nonadecane	2.01934E-06	12.5085 *	0 *	0 *	4.58906E-08
Eicosane	4.32477E-07	8.22616 *	0 *	0 *	2.43003E-08
Heneicosane	1.49045E-07	5.75636 *	0 *	0 *	1.42284E-08
Docosane	6.17679E-08	4.82288 *	0 *	0 *	1.06458E-08
Tricosane	1.70917E-08	3.78051 *	0 *	0 *	5.84652E-09
Tetracosane	6.04062E-09	3.28655 *	0 *	0 *	2.9828E-09
Pentacosane	2.27013E-09	2.73814 *	0 *	0 *	1.39014E-09
Hexacosane	6.90185E-10	2.13528 *	0 *	0 *	4.90128E-10
Heptacosane	1.53474E-10	1.47797 *	0 *	0 *	1.23195E-10
Octacosane	8.96811E-11	1.53242 *	0 *	0 *	7.31728E-11
Nonacosane	4.80285E-11	1.58687 *	0 *	0 *	4.01301E-11
Triacontane	1.03629E-11	0.82066 *	0 *	0 *	9.02619E-12
Hentriacontane	6.7328E-11	2.54365 *	0 *	0 *	0
Volumetric Flow	HT Flash Gas ft^3/h	Inlet Condensate gpm	Inlet Gas ft^3/h	Inlet Water gpm	PW Flash Gas ft^3/h
Water	8.97984	0	0.0127027	30.8357	58.6978
Nitrogen	0.714779	0.00451668	88.9918	0	0.328471
Carbon Dioxide	1.03707	0.00452639	11.9239	0	2.15057

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Volumetric Flow	HT Flash Gas ft^3/h	Inlet Condensate gpm	Inlet Gas ft^3/h	Inlet Water gpm	PW Flash Gas ft^3/h
Methane	367.995	2.29757	13317.1	0	136.264
Ethane	179.305	2.77117	443.299	0	24.9777
Propane	78.1561	3.44879	-288.458	0	4.86606
i-Butane	10.7811	1.17172	-75.2313	0	0.288856
n-Butane	22.9177	3.05129	-174.336	0	1.12591
2,2-Dimethylpropane	0.0560506	0.0411967	0	0	0.000931831
i-Pentane	6.48926	1.98542	-71.9151	0	0.171125
n-Pentane	6.84181	2.47847	-66.8531	0	0.127411
2,2-Dimethylbutane	0.24152	0.121934	-2.45045	0	0.00237316
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	0.386251	0.224471	-3.9874	0	0.00694222
2-Methylpentane	2.05981	1.38397	-19.2976	0	0.0404851
3-Methylpentane	1.3151	0.906218	-12.3487	0	0.055402
n-Hexane	2.86936	2.31961	-26.7784	0	0.0336286
Methylcyclopentane	0.45364	0.324978	-2.97361	0	0.0288826
Benzene	0.0662523	0.0379354	-0.403469	0	0.10325
Cyclohexane	0.402725	0.320294	-2.54136	0	0.0503086
2-Methylhexane	1.05168	1.35168	-10.2939	0	0.00849947
3-Methylhexane	0.828881	1.11663	-7.4883	0	0.00722819
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	1.55696	2.57732	-9.90289	0	0.0114316
Methylcyclohexane	0.892163	1.22867	-5.08626	0	0.0532458
Toluene	0.182618	0.211436	-1.18484	0	0.275924
n-Octane	1.44886	4.93982	-2.99244	0	0.00632264
Ethylbenzene	0.0743651	0.197919	0	0	0.102113
m-Xylene	0.0929623	0.227565	-1.48998	0	0.116503
o-Xylene	0.0981179	0.290195	0	0	0.168692
n-Nonane	0.355032	2.68647	-1.48059	0	0.000759553
Decane	0.110666	2.06253	-1.4611	0	9.48442E-05
Undecane	0.0255007	1.28625	-0.398738	0	1.26366E-05
Dodecane	0.00512037	0.709538	0	0	6.32301E-06
Tridecane	0.00114296	0.436327	0	0	3.09309E-06
Tetradecane	0.000242251	0.248926	0	0	1.36789E-06
Pentadecane	5.30393E-05	0.151838	0	0	6.26323E-07
Hexadecane	1.13386E-05	0.0843628	0	0	2.95576E-07
Heptadecane	3.44069E-06	0.0624356	0	0	2.00497E-07
Octadecane	1.02608E-06	0.044141	0	0	1.21086E-07
Nonadecane	2.65341E-07	0.0301432	0	0	7.075E-08
Eicosane	5.03897E-08	0.0198176	0	0	3.54858E-08
Heneicosane	1.55628E-08	0.013891	0	0	1.97345E-08
Docosane	5.75089E-09	0.0115527	0	0	1.40545E-08
Tricosane	1.39839E-09	0.00911944	0	0	7.35819E-09
Tetracosane	4.33765E-10	0.00800354	0	0	3.58656E-09
Pentacosane	1.43965E-10	0.00662131	0	0	1.60056E-09
Hexacosane	3.74743E-11	0.00522611	0	0	5.40734E-10
Heptacosane	7.04897E-12	0.00363756	0	0	1.30397E-10
Octacosane	3.52536E-12	0.00373734	0	0	7.44472E-11
Nonacosane	1.606E-12	0.00385847	0	0	3.931E-11
Triacontane	2.79747E-13	0.00200257	0	0	8.51832E-12
Hentriacontane	5.37453E-14	0.00674789	0	0	0

## Stream Properties

Property	Units	HT Flash Gas	Inlet Condensate	Inlet Gas	Inlet Water	PW Flash Gas
Temperature	°F	125 *	55 *	55 *	55 *	150.981
Pressure	psia	84.6959 *	1454.7 *	1454.7 *	1454.7 *	14.9459 *
Mole Fraction Vapor	%	100	0	100	0	100
Mole Fraction Light Liquid	%	0	100	0	100	0
Mole Fraction Heavy Liquid	%	0	0	0	0	0

Process Streams Report All Streams Tabulated by Total Phase						
Client Name:	CNX Gas Production LLC			Job:		
Location:	SHR3/40 Wellpad					
Flowsheet:	SHR3/40					
Stream Properties						
Property	Units	HT Flash Gas	Inlet Condensate	Inlet Gas	Inlet Water	PW Flash Gas
Molecular Weight	lb/lbmol	28.3035	73.3023	20.4833	18.0153	19.657
Mass Density	lb/ft^3	0.394061	41.3288	8.25837	62.485	0.0449567
Molar Flow	lbmol/h	9.71515	194.151	5270.32	857.842	0.526187
Mass Flow	lb/h	274.973	14231.7	107953	15454.3	10.3432
Vapor Volumetric Flow	ft^3/h	697.793	344.354	13072	247.328	230.071
Liquid Volumetric Flow	gpm	86.9975	42.9325	1629.75	30.8357	28.6842
Std Vapor Volumetric Flow	MMSCFD	0.0884819	1.76826	48 *	7.81289	0.00479231
Std Liquid Volumetric Flow	sgpm	1.37286	45.4299 *	638.296	30.8942 *	0.0516749
Compressibility		0.969539	0.467138	0.653259	0.0759356	0.997214
Specific Gravity		0.977242	0.662649	0.707233	1.00186	0.678701
API Gravity			82.9151		9.82512	
Enthalpy	Btu/h	-370013	-1.43502E+07 ?	-1.87722E+08	-1.05688E+08	-27257.6
Mass Enthalpy	Btu/lb	-1345.63	-1008.32 ?	-1738.92	-6838.74	-2635.31
Mass Cp	Btu/(lb*°F)	0.475837	0.518829 ?	0.896276	0.981376	0.497063
Ideal Gas CpCv Ratio		1.17763	1.07706	1.25726	1.32657	1.256
Dynamic Viscosity	cP	0.0106656	0.305216	0.016134	1.23668	0.0125642
Kinematic Viscosity	cSt	1.68967	0.461035	0.121962	1.23555	17.4469
Thermal Conductivity	Btu/(h*ft*°F)	0.0169159	0.0680923 ?	0.0268841	0.339837	0.0197008
Surface Tension	lbf/ft		0.0004091		0.00514522	
Net Ideal Gas Heating Value	Btu/ft^3	1505.65	3745.62	1124.51	0	807.644
Net Liquid Heating Value	Btu/lb	20065.5	19213.1	20774	-1059.76	15301.2
Gross Ideal Gas Heating Value	Btu/ft^3	1648.73	4045.76	1240.24	50.3101	903.803
Gross Liquid Heating Value	Btu/lb	21983.5	20765	22918	0	17157.6

**Remarks**

		Process Streams Report All Streams Tabulated by Total Phase			
Client Name:	CNX Gas Production LLC	Job:			
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
<b>Connections</b>					
	PW Loadout	To FLARE (11S- FLARE)	to LPS Flash	To Sales	To VDU- 9S COMB
From Block	Produced Water Tank	SPLT-101	MIX-101	MIX-102	SPLT-100
To Block	--	--	SPLT-101	--	--
<b>Stream Composition</b>					
Mole Fraction	PW Loadout %	To FLARE (11S- FLARE) %	to LPS Flash %	To Sales %	To VDU- 9S COMB %
Water	99.9982	1.98587	1.98587	0.878189	0.842487
Nitrogen	1.26606E-06	0.0711257	0.0711257	0.331491	0.00850567
Carbon Dioxide	0.000240853	0.15356	0.15356	0.118601	0.0805028
Methane	0.0010456	39.2916	39.2916	76.1093	12.3282
Ethane	0.000218219	25.3617	25.3617	14.3026	25.8673
Propane	2.96688E-05	15.5755	15.5755	4.48327	25.2434
i-Butane	8.76546E-07	2.68081	2.68081	0.588203	5.10555
n-Butane	6.49979E-06	6.09589	6.09589	1.24544	12.0537
2,2-Dimethylpropane	1.85618E-09	0.01576	0.01576	0.00314103	0.0319967
i-Pentane	5.46896E-07	1.95262	1.95262	0.385293	4.07725
n-Pentane	2.83595E-07	2.09176	2.09176	0.411936	4.40193
2,2-Dimethylbutane	2.7776E-09	0.0767357	0.0767357	0.0152365	0.16342
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	1.46565E-08	0.123984	0.123984	0.0252395	0.264448
2-Methylpentane	9.28958E-08	0.66154	0.66154	0.137608	1.40909
3-Methylpentane	2.73301E-07	0.424061	0.424061	0.0884709	0.903174
n-Hexane	4.49186E-08	0.926866	0.926866	0.202784	1.97213
Methylcyclopentane	2.12278E-07	0.146229	0.146229	0.0302799	0.311864
Benzene	4.34538E-05	0.0225727	0.0225727	0.00436351	0.0447815
Cyclohexane	7.25632E-07	0.129922	0.129922	0.0280597	0.275515
2-Methylhexane	7.5487E-09	0.34501	0.34501	0.0837016	0.731006
3-Methylhexane	6.83842E-09	0.271303	0.271303	0.0666489	0.574146
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	9.0082E-09	0.50988	0.50988	0.131824	1.07465
Methylcyclohexane	3.42668E-07	0.290827	0.290827	0.0714374	0.614223
Toluene	9.26242E-05	0.0628537	0.0628537	0.0144653	0.123773
n-Octane	2.75198E-09	0.475479	0.475479	0.148162	0.985954
Ethylbenzene	2.48013E-05	0.0255385	0.0255385	0.00719763	0.0497529
m-Xylene	2.41337E-05	0.0318227	0.0318227	0.00912485	0.0622997
o-Xylene	6.29386E-05	0.0342049	0.0342049	0.0097425	0.0654473
n-Nonane	1.49941E-10	0.117573	0.117573	0.0446136	0.239505
Decane	7.05437E-12	0.0368131	0.0368131	0.0172524	0.0733338
Undecane	4.8986E-13	0.00844673	0.00844673	0.00476673	0.0164539
Dodecane	5.69766E-13	0.00172022	0.00172022	0.00116653	0.00328204
Tridecane	5.61716E-13	0.000385582	0.000385582	0.000320773	0.000717102
Tetradecane	4.82332E-13	8.2911E-05	8.2911E-05	8.34752E-05	0.000150511
Pentadecane	4.31382E-13	1.84234E-05	1.84234E-05	2.18859E-05	3.27376E-05
Hexadecane	4.19147E-13	4.02721E-06	4.02721E-06	5.73897E-06	6.97903E-06
Heptadecane	6.01124E-13	1.26307E-06	1.26307E-06	2.14241E-06	2.13493E-06
Octadecane	6.84371E-13	3.84411E-07	3.84411E-07	7.65992E-07	6.32512E-07
Nonadecane	8.45096E-13	1.02965E-07	1.02965E-07	2.45447E-07	1.63753E-07
Eicosane	1.03123E-12	2.05077E-08	2.05077E-08	6.12434E-08	3.08088E-08
Heneicosane	1.0343E-12	6.72771E-09	6.72771E-09	2.2811E-08	9.67729E-09
Docosane	1.51928E-12	2.708E-09	2.708E-09	1.03272E-08	3.64934E-09
Tricosane	2.18372E-12	7.56108E-10	7.56108E-10	3.29682E-09	9.00429E-10
Tetracosane	2.40612E-12	2.68524E-10	2.68524E-10	1.31939E-09	2.86745E-10
Pentacosane	2.29683E-12	1.00306E-10	1.00306E-10	5.50381E-10	9.80552E-11
Hexacosane	1.92118E-12	2.99857E-11	2.99857E-11	1.92366E-10	2.68387E-11
Heptacosane	1.36207E-12	6.53756E-12	6.53756E-12	5.04374E-11	5.32045E-12
Octacosane	1.49153E-12	3.66617E-12	3.66617E-12	3.19862E-11	2.87648E-12
Nonacosane	1.41784E-12	1.89045E-12	1.89045E-12	1.87642E-11	1.42076E-12

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:		Job:			
Location:					
Flowsheet:					
Stream Composition					
Mole Fraction	PW Loadout	To FLARE (11S- FLARE) %	to LPS Flash	To Sales	To VDU- 9S COMB %
Triacontane	7.16605E-13	3.9467E-13	3.9467E-13	4.61408E-12	2.78841E-13
Hentriacontane	0	1.61627E-12	1.61627E-12	3.31036E-11	1.85913E-12
Molar Flow	PW Loadout lbmol/h	To FLARE (11S- FLARE) lbmol/h	to LPS Flash lbmol/h	To Sales lbmol/h	To VDU- 9S COMB lbmol/h
Water	809.821	0.0148306	0.296612	48.0042	0.00208174
Nitrogen	1.0253E-05	0.000531172	0.0106234	18.1202	2.10171E-05
Carbon Dioxide	0.00195051	0.00114679	0.0229359	6.48302	0.000198918
Methane	0.00846765	0.293432	5.86864	4160.34	0.0304623
Ethane	0.00176721	0.189403	3.78805	781.817	0.0639168
Propane	0.000240269	0.116319	2.32638	245.068	0.0623751
i-Butane	7.09857E-06	0.0200205	0.40041	32.1528	0.0126155
n-Butane	5.26376E-05	0.0455245	0.910491	68.079	0.0297841
2,2-Dimethylpropane	1.5032E-08	0.000117697	0.00235394	0.171697	7.90621E-05
i-Pentane	4.42895E-06	0.0145823	0.291647	21.0611	0.0100747
n-Pentane	2.29665E-06	0.0156214	0.312428	22.5176	0.0108769
2,2-Dimethylbutane	2.2494E-08	0.000573068	0.0114614	0.832869	0.000403802
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	1.18693E-07	0.000925925	0.0185185	1.37966	0.000653438
2-Methylpentane	7.52303E-07	0.00494043	0.0988086	7.52203	0.00348179
3-Methylpentane	2.21329E-06	0.00316692	0.0633384	4.83606	0.0022317
n-Hexane	3.63767E-07	0.0069219	0.138438	11.0847	0.00487304
Methylcyclopentane	1.7191E-06	0.00109205	0.021841	1.65518	0.000770601
Benzene	0.000351904	0.000168574	0.00337148	0.238521	0.000110653
Cyclohexane	5.87643E-06	0.000970264	0.0194053	1.53382	0.000680782
2-Methylhexane	6.11321E-08	0.00257656	0.0515312	4.57536	0.00180628
3-Methylhexane	5.53799E-08	0.00202611	0.0405221	3.64321	0.00141868
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	7.29515E-08	0.00380782	0.0761564	7.20588	0.0026554
Methylcyclohexane	2.77505E-06	0.00217191	0.0434383	3.90496	0.00151771
Toluene	0.000750103	0.000469396	0.00938791	0.790711	0.000305837
n-Octane	2.22865E-08	0.00355091	0.0710182	8.09895	0.00243624
Ethylbenzene	0.00020085	0.000190723	0.00381447	0.393442	0.000122937
m-Xylene	0.000195443	0.000237654	0.00475308	0.498789	0.000153939
o-Xylene	0.000509699	0.000255444	0.00510888	0.532551	0.000161717
n-Nonane	1.21427E-09	0.000878043	0.0175609	2.4387	0.000591805
Decane	5.71287E-11	0.000274923	0.00549845	0.943063	0.000181204
Undecane	3.96706E-12	6.30808E-05	0.00126162	0.260563	4.06568E-05
Dodecane	4.61417E-12	1.28467E-05	0.000256934	0.0637655	8.10975E-06
Tridecane	4.54897E-12	2.87955E-06	5.7591E-05	0.0175343	1.77192E-06
Tetradecane	3.90609E-12	6.19185E-07	1.23837E-05	0.00456298	3.71904E-07
Pentadecane	3.49348E-12	1.37587E-07	2.75175E-06	0.00119635	8.0893E-08
Hexadecane	3.3944E-12	3.00755E-08	6.01509E-07	0.000313708	1.72448E-08
Heptadecane	4.86811E-12	9.43269E-09	1.88654E-07	0.00011711	5.27529E-09
Octadecane	5.54228E-12	2.8708E-09	5.74161E-08	4.18712E-05	1.5629E-09
Nonadecane	6.84389E-12	7.6895E-10	1.5379E-08	1.34168E-05	4.04625E-10
Eicosane	8.35128E-12	1.53153E-10	3.06305E-09	3.34773E-06	7.61269E-11
Heneicosane	8.37613E-12	5.0243E-11	1.00486E-09	1.24691E-06	2.39121E-11
Docosane	1.23036E-11	2.02235E-11	4.0447E-10	5.64515E-07	9.01734E-12
Tricosane	1.76845E-11	5.64667E-12	1.12933E-10	1.80213E-07	2.22491E-12
Tetracosane	1.94856E-11	2.00535E-12	4.01071E-11	7.21215E-08	7.08531E-13
Pentacosane	1.86005E-11	7.49096E-13	1.49819E-11	3.00853E-08	2.42289E-13
Hexacosane	1.55584E-11	2.23935E-13	4.47871E-12	1.05153E-08	6.63171E-14
Heptacosane	1.10305E-11	4.8823E-14	9.76459E-13	2.75704E-09	1.31466E-14
Octacosane	1.20789E-11	2.73792E-14	5.47584E-13	1.74845E-09	7.10764E-15
Nonacosane	1.14822E-11	1.4118E-14	2.82361E-13	1.0257E-09	3.51061E-15
Triacontane	5.80332E-12	2.94742E-15	5.89484E-14	2.52218E-10	6.89001E-16

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:		Job:			
Location:					
Flowsheet:					
Molar Flow	PW Loadout	To FLARE (11S- FLARE)	to LPS Flash	To Sales	To VDU- 9S COMB
	Ibmol/h	Ibmol/h	Ibmol/h	Ibmol/h	Ibmol/h
Hentriacontane	0	1.20704E-14	2.41408E-13	1.80953E-09	4.59381E-15
Mass Fraction	PW Loadout	To FLARE (11S- FLARE)	to LPS Flash	To Sales	To VDU- 9S COMB
	%	%	%	%	%
Water	99.9967	1.05962	1.05962	0.734282	0.325409
Nitrogen	1.96867E-06	0.0590134	0.0590134	0.430995	0.00510857
Carbon Dioxide	0.00058837	0.200162	0.200162	0.242252	0.0759596
Methane	0.000931086	18.6693	18.6693	56.6686	4.24029
Ethane	0.000364221	22.5869	22.5869	19.9603	16.6762
Propane	7.26187E-05	20.3421	20.3421	9.1754	23.8654
i-Butane	2.82793E-06	4.61495	4.61495	1.58673	6.36224
n-Butane	2.09698E-05	10.4939	10.4939	3.35968	15.0206
2,2-Dimethylpropane	7.43365E-09	0.0336778	0.0336778	0.0105181	0.0494947
i-Pentane	2.19021E-06	4.17259	4.17259	1.29019	6.30698
n-Pentane	1.13574E-06	4.46992	4.46992	1.37941	6.80922
2,2-Dimethylbutane	1.32863E-08	0.195857	0.195857	0.06094	0.301935
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	7.01076E-08	0.316453	0.316453	0.100948	0.488595
2-Methylpentane	4.44356E-07	1.68849	1.68849	0.550378	2.60344
3-Methylpentane	1.30731E-06	1.08236	1.08236	0.353849	1.66871
n-Hexane	2.14863E-07	2.36569	2.36569	0.811055	3.64372
Methylcyclopentane	9.91653E-07	0.364498	0.364498	0.118275	0.562722
Benzene	0.000188407	0.0522225	0.0522225	0.0158193	0.0749965
Cyclohexane	3.38978E-06	0.323849	0.323849	0.109602	0.497133
2-Methylhexane	4.19857E-08	1.02392	1.02392	0.389264	1.57044
3-Methylhexane	3.80351E-08	0.805171	0.805171	0.309958	1.23346
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	5.01033E-08	1.51322	1.51322	0.613065	2.3087
Methylcyclohexane	1.86757E-06	0.84575	0.84575	0.325544	1.29301
Toluene	0.000473716	0.171526	0.171526	0.0618588	0.244508
n-Octane	1.7449E-08	1.60866	1.60866	0.7855	2.41466
Ethylbenzene	0.000146153	0.0803036	0.0803036	0.0354654	0.113247
m-Xylene	0.000142219	0.100064	0.100064	0.0449615	0.141805
o-Xylene	0.000370895	0.107554	0.107554	0.0480049	0.14897
n-Nonane	1.06745E-09	0.446622	0.446622	0.265568	0.65859
Decane	5.57134E-11	0.155135	0.155135	0.113929	0.223706
Undecane	4.25017E-12	0.0391047	0.0391047	0.0345809	0.0551412
Dodecane	5.38707E-12	0.0086785	0.0086785	0.00922215	0.0119859
Tridecane	5.7483E-12	0.00210545	0.00210545	0.00274474	0.0028345
Tetradecane	5.31146E-12	0.000487176	0.000487176	0.000768611	0.000640189
Pentadecane	5.08626E-12	0.000115908	0.000115908	0.000215766	0.000149093
Hexadecane	5.26834E-12	2.70096E-05	2.70096E-05	6.03148E-05	3.38825E-05
Heptadecane	8.02367E-12	8.99586E-06	8.99586E-06	2.39108E-05	1.10069E-05
Octadecane	9.66767E-12	2.89756E-06	2.89756E-06	9.04766E-06	3.45122E-06
Nonadecane	1.25961E-11	8.18891E-07	8.18891E-07	3.05894E-06	9.42741E-07
Eicosane	1.61734E-11	1.71619E-07	1.71619E-07	8.03128E-07	1.86634E-07
Heneicosane	1.70268E-11	5.90961E-08	5.90961E-08	3.13987E-07	6.15335E-08
Docosane	2.61934E-11	2.4912E-08	2.4912E-08	1.48875E-07	2.4302E-08
Tricosane	3.93491E-11	7.26988E-09	7.26988E-09	4.96722E-08	6.267E-09
Tetracosane	4.52298E-11	2.69337E-09	2.69337E-09	2.07378E-08	2.08198E-09
Pentacosane	4.49637E-11	1.04778E-09	1.04778E-09	9.00904E-09	7.41442E-10
Hexacosane	3.91057E-11	3.25681E-10	3.25681E-10	3.27403E-09	2.11012E-10
Heptacosane	2.87854E-11	7.37217E-11	7.37217E-11	8.91267E-10	4.34305E-11
Octacosane	3.26826E-11	4.28651E-11	4.28651E-11	5.86043E-10	2.43456E-11
Nonacosane	3.21719E-11	2.28887E-11	2.28887E-11	3.56009E-10	1.24521E-11
Tricontane	1.68182E-11	4.94243E-12	4.94243E-12	9.05457E-11	2.52773E-12
Hentriacontane	0	2.09119E-11	2.09119E-11	6.71169E-10	1.74123E-11

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Mass Flow	PW Loadout lb/h	To FLARE (11S- FLARE) lb/h	to LPS Flash lb/h	To Sales lb/h	To VDU- 9S COMB lb/h
Water	14589.1	0.267177	5.34355	864.809	0.0375032
Nitrogen	0.000287221	0.0148799	0.297599	507.609	0.00058876
Carbon Dioxide	0.0858409	0.0504698	1.0094	285.315	0.00875429
Methane	0.135842	4.70737	94.1474	66742.1	0.488691
Ethane	0.0531384	5.69516	113.903	23508.5	1.92192
Propane	0.0105948	5.12916	102.583	10806.4	2.75047
i-Butane	0.000412585	1.16363	23.2727	1868.79	0.733243
n-Butane	0.00305941	2.64599	52.9197	3956.9	1.73112
2,2-Dimethylpropane	1.08454E-06	0.00849168	0.169834	12.3878	0.00570424
i-Pentane	0.000319543	1.0521	21.0419	1519.54	0.726875
n-Pentane	0.000165701	1.12707	22.5413	1624.61	0.784758
2,2-Dimethylbutane	1.93843E-06	0.0493843	0.987686	71.7727	0.0347978
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	1.02284E-05	0.0797919	1.59584	118.892	0.0563103
2-Methylpentane	6.48299E-05	0.425743	8.51486	648.214	0.300045
3-Methylpentane	0.000190731	0.27291	5.45821	416.749	0.192317
n-Hexane	3.13477E-05	0.596497	11.9299	955.229	0.419936
Methylcyclopentane	0.000144678	0.0919062	1.83812	139.299	0.0648534
Benzene	0.0274879	0.0131676	0.263353	18.6313	0.0086433
Cyclohexane	0.000494557	0.0816569	1.63314	129.085	0.0572943
2-Methylhexane	6.12555E-06	0.258176	5.16353	458.46	0.180992
3-Methylhexane	5.54918E-06	0.20302	4.0604	365.057	0.142155
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	7.30988E-06	0.381551	7.63101	722.043	0.266077
Methylcyclohexane	0.000272471	0.213252	4.26503	383.413	0.149018
Toluene	0.0691133	0.0432494	0.864987	72.8549	0.0281794
n-Octane	2.54575E-06	0.405615	8.1123	925.131	0.278288
Ethylbenzene	0.0213232	0.0202481	0.404963	41.7697	0.0130516
m-Xylene	0.0207492	0.0252305	0.50461	52.9539	0.016343
o-Xylene	0.0541122	0.0271192	0.542385	56.5383	0.0171687
n-Nonane	1.55737E-07	0.112613	2.25227	312.776	0.075902
Decane	8.12837E-09	0.0391164	0.782329	134.181	0.025782
Undecane	6.20084E-10	0.00986005	0.197201	40.7281	0.00635499
Dodecane	7.85953E-10	0.00218824	0.0437648	10.8615	0.00138137
Tridecane	8.38655E-10	0.000530878	0.0106176	3.23265	0.000326674
Tetradecane	7.74922E-10	0.000122839	0.00245678	0.90524	7.37814E-05
Pentadecane	7.42066E-10	2.92256E-05	0.000584511	0.254121	1.71829E-05
Hexadecane	7.68631E-10	6.81032E-06	0.000136206	0.0710364	3.90494E-06
Heptadecane	1.17062E-09	2.26826E-06	4.53652E-05	0.0281612	1.26854E-06
Octadecane	1.41048E-09	7.30604E-07	1.46121E-05	0.010656	3.9775E-07
Nonadecane	1.83773E-09	2.06479E-07	4.12958E-06	0.0036027	1.0865E-07
Eicosane	2.35963E-09	4.32729E-08	8.65457E-07	0.000945893	2.15095E-08
Heneicosane	2.48414E-09	1.49008E-08	2.98015E-07	0.000369802	7.0917E-09
Docosane	3.82152E-09	6.28144E-09	1.25629E-07	0.000175339	2.80079E-09
Tricosane	5.74088E-09	1.83306E-09	3.66612E-08	5.8502E-05	7.22267E-10
Tetracosane	6.59886E-09	6.7912E-10	1.35824E-08	2.44242E-05	2.39947E-10
Pentacosane	6.56004E-09	2.64191E-10	5.28383E-09	1.06105E-05	8.54507E-11
Hexacosane	5.70537E-09	8.21187E-11	1.64237E-09	3.85602E-06	2.4319E-11
Heptacosane	4.19969E-09	1.85885E-11	3.71771E-10	1.0497E-06	5.00533E-12
Octacosane	4.76828E-09	1.08082E-11	2.16164E-10	6.90219E-07	2.80581E-12
Nonacosane	4.69376E-09	5.77127E-12	1.15425E-10	4.19294E-07	1.43509E-12
Triacontane	2.45372E-09	1.24621E-12	2.49242E-11	1.06641E-07	2.91319E-13
Hentriacontane	0	5.27282E-12	1.05456E-10	7.90476E-07	2.00676E-12
Volumetric Flow	PW Loadout gpm	To FLARE (11S- FLARE) ft^3/h	to LPS Flash ft^3/h	To Sales ft^3/h	To VDU- 9S COMB ft^3/h
Water	29.7403	6.52369	130.474	632.084	0.859857
Nitrogen	8.2875E-07	0.234843	4.69685	269.023	0.00874536
Carbon Dioxide	0.000142839	0.503917	10.0783	83.488	0.0819796

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Volumetric Flow	PW Loadout	To FLARE (11S- FLARE) ft^3/h	to LPS Flash	To Sales	To VDU- 9S COMB ft^3/h
	gpm	ft^3/h	ft^3/h	ft^3/h	ft^3/h
Methane	0.000711096	129.26	2585.2	57026.7	12.6024
Ethane	0.00018772	82.8964	1657.93	9246.96	26.1649
Propane	3.18276E-05	50.6489	1012.98	2554.88	25.3141
i-Butane	1.13015E-06	8.67936	173.587	296.709	5.08217
n-Butane	8.26689E-06	19.7184	394.367	610.023	11.9799
2,2-Dimethylpropane	2.78115E-09	0.0508461	1.01692	1.42944	0.03166
i-Pentane	8.02334E-07	6.28646	125.729	156.178	4.02255
n-Pentane	4.16682E-07	6.73091	134.618	168.725	4.33689
2,2-Dimethylbutane	4.61574E-09	0.246227	4.92454	5.81879	0.160199
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	2.41301E-08	0.397468	7.94936	9.26747	0.258833
2-Methylpentane	1.54999E-07	2.11984	42.3968	49.7212	1.37786
3-Methylpentane	4.51158E-07	1.35866	27.1732	31.6606	0.882997
n-Hexane	7.48094E-08	2.96611	59.3221	68.4398	1.92425
Methylcyclopentane	3.12477E-07	0.468964	9.37928	11.085	0.305488
Benzene	5.32008E-05	0.0725365	1.45073	1.6585	0.0440451
Cyclohexane	1.03787E-06	0.416524	8.33049	9.7013	0.26986
2-Methylhexane	1.4096E-08	1.09977	21.9954	23.8151	0.708476
3-Methylhexane	1.26511E-08	0.864834	17.2967	18.8868	0.556481
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	1.686E-08	1.62336	32.4671	34.2935	1.03952
Methylcyclohexane	5.6553E-07	0.928174	18.5635	20.7046	0.596774
Toluene	0.000132291	0.200899	4.01797	4.43816	0.120616
n-Octane	5.68267E-09	1.506	30.1199	28.4446	0.944885
Ethylbenzene	4.02479E-05	0.0811838	1.62368	1.5637	0.0480526
m-Xylene	3.9378E-05	0.101104	2.02208	1.90858	0.0601147
o-Xylene	0.000101086	0.108676	2.17351	2.01989	0.0631602
n-Nonane	3.39256E-10	0.370146	7.40292	4.72948	0.227127
Decane	1.74219E-11	0.115227	2.30455	0.169537	0.0688883
Undecane	1.31075E-12	0.0263115	0.52623	-0.150276	0.0153074
Dodecane	1.64428E-12	0.00532656	0.106531	-0.130087	0.00302173
Tridecane	1.7487E-12	0.00118754	0.0237509	-0.0582607	0.000653654
Tetradecane	1.60176E-12	0.000253881	0.00507762	-0.0214756	0.000135759
Pentadecane	1.52733E-12	5.61342E-05	0.00112268	-0.00712123	2.92708E-05
Hexadecane	1.57737E-12	1.21988E-05	0.000243976	-0.00230051	6.17349E-06
Heptadecane	2.37763E-12	3.80152E-06	7.60305E-05	-0.00103017	1.86632E-06
Octadecane	2.84758E-12	1.15171E-06	2.30343E-05	-0.000414836	5.48328E-07
Nonadecane	3.70656E-12	3.06734E-07	6.13469E-06	-0.000151041	1.40471E-07
Eicosane	4.76543E-12	6.0709E-08	1.21418E-06	-4.28355E-05	2.61203E-08
Heneicosane	5.02926E-12	1.98099E-08	3.96198E-07	-1.74913E-05	8.12373E-09
Docosane	7.68797E-12	7.92923E-09	1.58585E-07	-8.64278E-06	3.03153E-09
Tricosane	1.16597E-11	2.19979E-09	4.39958E-08	-3.03502E-06	7.39059E-10
Tetracosane	1.35186E-11	7.76433E-10	1.55287E-08	-1.31827E-06	2.32636E-10
Pentacosane	1.3361E-11	2.88477E-10	5.76954E-09	-5.87881E-07	7.87468E-11
Hexacosane	1.17662E-11	8.56518E-11	1.71304E-09	-2.2189E-07	2.12747E-11
Heptacosane	8.71963E-12	1.8549E-11	3.7098E-10	-6.25893E-08	4.16393E-12
Octacosane	9.81691E-12	1.03443E-11	2.06885E-10	-4.18149E-08	2.22712E-12
Nonacosane	9.63942E-12	5.30617E-12	1.06123E-10	-2.57376E-08	1.08898E-12
Triacontane	5.0604E-12	1.10071E-12	2.20142E-11	-6.6939E-09	2.11089E-13
Hentriacontane	0	4.36207E-12	8.72415E-11	-5.91929E-08	1.31824E-12

## Stream Properties

Property	Units	PW Loadout	To FLARE (11S- FLARE)	to LPS Flash	To Sales	To VDU- 9S COMB
Temperature	°F	150.981	153.448	153.448	152.003	113.607
Pressure	psia	14.9459	14.9459	14.9459	464.696	14.9459
Mole Fraction Vapor	%	0	100	100	100	100
Mole Fraction Light Liquid	%	100	0	0	0	0
Mole Fraction Heavy Liquid	%	0	0	0	0	0

Process Streams Report All Streams Tabulated by Total Phase						
Client Name:	CNX Gas Production LLC			Job:		
Location:	SHR3/40 Wellpad					
Flowsheet:	SHR3/40					
Stream Properties						
Property	Units	PW Loadout	To FLARE (11S- FLARE)	to LPS Flash	To Sales	To VDU- 9S COMB
Molecular Weight	lb/lbmol	18.0156	33.763	33.763	21.546	46.6417
Mass Density	lb/ft^3	61.1587	0.0772	0.0772	1.65012	0.115063
Molar Flow	lbmol/h	809.835	0.746807	14.9361	5466.27	0.247095
Mass Flow	lb/h	14589.6	25.2145	504.29	117776	11.5249
Vapor Volumetric Flow	ft^3/h	238.554	326.612	6532.25	71374.1	100.162
Liquid Volumetric Flow	gpm	29.7417	40.7205	814.41	8898.59	12.4877
Std Vapor Volumetric Flow	MMSCFD	7.37567	0.00680163	0.136033	49.7847	0.00225044
Std Liquid Volumetric Flow	sgpm	29.1667	0.114017	2.28034	670.711	0.0450426
Compressibility		0.000671825	0.993437	0.993437	0.924349	0.98477
Specific Gravity		0.980594	1.16575	1.16575	0.743924	1.61041
API Gravity		10.0008				
Enthalpy	Btu/h	-9.84571E+07	-30536.2	-610724	-1.8935E+08	-11679.9
Mass Enthalpy	Btu/lb	-6748.43	-1211.06	-1211.06	-1607.71	-1013.45
Mass Cp	Btu/(lb*°F)	0.984282	0.468637	0.468637	0.558662	0.428095
Ideal Gas CpCv Ratio		1.32206	1.14416	1.14416	1.22083	1.11123
Dynamic Viscosity	cP	0.431824	0.0104858	0.0104858	0.012434	0.00881636
Kinematic Viscosity	cSt	0.440786	8.47936	8.47936	0.470407	4.78336
Thermal Conductivity	Btu/(h*ft*°F)	0.377455 ?	0.0164179	0.0164179	0.0218401	0.0120868
Surface Tension	lbf/ft	0.0044369				
Net Ideal Gas Heating Value	Btu/ft^3	0.0251257	1770.03	1770.03	1168.53	2424.97
Net Liquid Heating Value	Btu/lb	-1059.2	19750.6	19750.6	20505.4	19565.2
Gross Ideal Gas Heating Value	Btu/ft^3	50.3363	1932.01	1932.01	1287.48	2633.46
Gross Liquid Heating Value	Btu/lb	0.567865	21570.7	21570.7	22600.3	21260.7
Remarks						

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Connections					
	VRU Vapor	Water From GPU	1	2	3
From Block	VRU Engine	GPU	Flash Compressor	SPLT-101	XCHG-100
To Block	MIX-101	Produced Water Tank	MIX-102	Flash Compressor	GPU
Stream Composition					
Mole Fraction	VRU Vapor %	Water From GPU %	1 %	2 %	3 %
Water	0.842487	99.9499	1.98587	1.98587	13.5686
Nitrogen	0.00850567	9.35759E-05	0.0711257	0.0711257	0.286617
Carbon Dioxide	0.0805028	0.000848143	0.15356	0.15356	0.102601
Methane	12.3282	0.03942	39.2916	39.2916	65.8098
Ethane	25.8673	0.00727792	25.3617	25.3617	12.3744
Propane	25.2434	0.00140905	15.5755	15.5755	3.89284
i-Butane	5.10555	8.29594E-05	2.68081	2.68081	0.515424
n-Butane	12.0537	0.000326621	6.09589	6.09589	1.09892
2,2-Dimethylpropane	0.0319967	2.6727E-07	0.01576	0.01576	0.0027937
i-Pentane	4.07725	4.93642E-05	1.95262	1.95262	0.35029
n-Pentane	4.40193	3.66333E-05	2.09176	2.09176	0.379705
2,2-Dimethylbutane	0.16342	6.81301E-07	0.0767357	0.0767357	0.0145561
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	0.264448	2.00068E-06	0.123984	0.123984	0.024742
2-Methylpentane	1.40909	1.16646E-05	0.66154	0.66154	0.135839
3-Methylpentane	0.903174	1.61103E-05	0.424061	0.424061	0.0884397
n-Hexane	1.97213	9.66635E-06	0.926866	0.926866	0.207404
Methylcyclopentane	0.311864	8.46797E-06	0.146229	0.146229	0.031152
Benzene	0.0447815	7.29784E-05	0.0225727	0.0225727	0.00453107
Cyclohexane	0.275515	1.51125E-05	0.129922	0.129922	0.0300764
2-Methylhexane	0.731006	2.44799E-06	0.34501	0.34501	0.0959635
3-Methylhexane	0.574146	2.08229E-06	0.271303	0.271303	0.0777854
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	1.07465	3.29211E-06	0.50988	0.50988	0.162353
Methylcyclohexane	0.614223	1.56149E-05	0.290827	0.290827	0.0895449
Toluene	0.123773	0.000171796	0.0628537	0.0628537	0.0189127
n-Octane	0.985954	1.8232E-06	0.475479	0.475479	0.25598
Ethylbenzene	0.0497529	5.42137E-05	0.0255385	0.0255385	0.013508
m-Xylene	0.0622997	5.77067E-05	0.0318227	0.0318227	0.0177241
o-Xylene	0.0654473	0.000111528	0.0342049	0.0342049	0.0202006
n-Nonane	0.239505	2.19629E-07	0.117573	0.117573	0.12699
Decane	0.0733338	2.75136E-08	0.0368131	0.0368131	0.089724
Undecane	0.0164539	3.67375E-09	0.00844673	0.00844673	0.0512869
Dodecane	0.00328204	1.84457E-09	0.00172022	0.00172022	0.0260643
Tridecane	0.000717102	9.05418E-10	0.000385582	0.000385582	0.0148895
Tetradecane	0.0000150511	4.01942E-10	8.2911E-05	8.2911E-05	0.00798201
Pentadecane	3.27376E-05	1.84781E-10	1.84234E-05	1.84234E-05	0.0045743
Hexadecane	6.97903E-06	8.77067E-11	4.02721E-06	4.02721E-06	0.0023946
Heptadecane	2.13493E-06	6.00185E-11	1.26307E-06	1.26307E-06	0.0016885
Octadecane	6.32512E-07	3.66629E-11	3.84411E-07	3.84411E-07	0.0011359
Nonadecane	1.63753E-07	2.19341E-11	1.02965E-07	1.02965E-07	0.000736801
Eicosane	3.08088E-08	1.16436E-11	2.05077E-08	2.05077E-08	0.0004605
Heneicosane	9.67729E-09	6.95396E-12	6.72771E-09	6.72771E-09	0.000307
Docosane	3.64934E-09	5.74789E-12	2.708E-09	2.708E-09	0.0002456
Tricosane	9.00429E-10	4.40476E-12	7.56108E-10	7.56108E-10	0.0001842
Tetracosane	2.86745E-10	3.49145E-12	2.68524E-10	2.68524E-10	0.0001535
Pentacosane	9.80552E-11	2.78174E-12	1.00306E-10	1.00306E-10	0.0001228
Hexacosane	2.68387E-11	2.08487E-12	2.99857E-11	2.99857E-11	9.21001E-05
Heptacosane	5.32045E-12	1.40111E-12	6.53756E-12	6.53756E-12	6.14001E-05
Octacosane	2.87648E-12	1.51343E-12	3.66617E-12	3.66617E-12	6.14001E-05

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Stream Composition					
Mole Fraction	VRU Vapor %	Water From GPU %	1 %	2 %	3 %
Nonacosane	1.42076E-12	1.42903E-12	1.89045E-12	1.89045E-12	6.14001E-05
Triacontane	2.78841E-13	7.18774E-13	3.9467E-13	3.9467E-13	3.07E-05
Hentriacontane	1.85913E-12	6.0343E-72	1.61627E-12	1.61627E-12	9.21001E-05
Molar Flow	VRU Vapor lbmol/h	Water From GPU lbmol/h	1 lbmol/h	2 lbmol/h	3 lbmol/h
Water	0.0395531	809.955	0.281781	0.281781	857.847
Nitrogen	0.000399324	0.000758303	0.0100923	0.0100923	18.1208
Carbon Dioxide	0.00377945	0.00687302	0.0217891	0.0217891	6.48674
Methane	0.578785	0.319444	5.57521	5.57521	4160.7
Ethane	1.21442	0.0589775	3.59865	3.59865	782.348
Propane	1.18513	0.0114184	2.21006	2.21006	246.117
i-Butane	0.239695	0.000672271	0.380389	0.380389	32.5867
n-Butane	0.565898	0.00264681	0.864966	0.864966	69.4773
2,2-Dimethylpropane	0.00150218	2.16585E-06	0.00223624	0.00223624	0.176627
i-Pentane	0.191419	0.000400028	0.277064	0.277064	22.1464
n-Pentane	0.206662	0.00029686	0.296807	0.296807	24.0061
2,2-Dimethylbutane	0.00767224	5.521E-06	0.0108883	0.0108883	0.920284
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	0.0124153	1.62128E-05	0.0175926	0.0175926	1.56426
2-Methylpentane	0.0661541	9.45252E-05	0.0938681	0.0938681	8.58815
3-Methylpentane	0.0424022	0.000130551	0.0601715	0.0601715	5.59143
n-Hexane	0.0925878	7.83324E-05	0.131516	0.131516	13.1127
Methylcyclopentane	0.0146414	6.86211E-05	0.0207489	0.0207489	1.96952
Benzene	0.0021024	0.000591388	0.00320291	0.00320291	0.286468
Cyclohexane	0.0129349	0.000122466	0.018435	0.018435	1.90152
2-Methylhexane	0.0343193	1.98376E-05	0.0489546	0.0489546	6.06711
3-Methylhexane	0.026955	1.68741E-05	0.038496	0.038496	4.91784
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	0.0504527	2.6678E-05	0.0723485	0.0723485	10.2645
Methylcyclohexane	0.0288366	0.000126537	0.0412663	0.0412663	5.6613
Toluene	0.00581091	0.00139217	0.00891851	0.00891851	1.19572
n-Octane	0.0462886	1.47745E-05	0.0674673	0.0674673	16.1838
Ethylbenzene	0.0023358	0.000439327	0.00362374	0.00362374	0.854018
m-Xylene	0.00292485	0.000467632	0.00451542	0.00451542	1.12057
o-Xylene	0.00307262	0.000903781	0.00485344	0.00485344	1.27715
n-Nonane	0.0112443	1.77979E-06	0.0166828	0.0166828	8.02868
Decane	0.00344288	2.2296E-07	0.00522353	0.00522353	5.67263
Undecane	0.000772479	2.97707E-08	0.00119853	0.00119853	3.24251
Dodecane	0.000154085	1.49477E-08	0.000244087	0.000244087	1.64787
Tridecane	3.36665E-05	7.33716E-09	5.47115E-05	5.47115E-05	0.941361
Tetradecane	7.06619E-06	3.25718E-09	1.17645E-05	1.17645E-05	0.504647
Pentadecane	1.53697E-06	1.4974E-09	2.61416E-06	2.61416E-06	0.289202
Hexadecane	3.27651E-07	7.10741E-10	5.71434E-07	5.71434E-07	0.151394
Heptadecane	1.0023E-07	4.86367E-10	1.79221E-07	1.79221E-07	0.106752
Octadecane	2.96952E-08	2.97102E-10	5.45453E-08	5.45453E-08	0.0718152
Nonadecane	7.68787E-09	1.77745E-10	1.461E-08	1.461E-08	0.0465828
Eicosane	1.44641E-09	9.43554E-11	2.9099E-09	2.9099E-09	0.0291143
Heneicosane	4.54329E-10	5.63522E-11	9.54617E-10	9.54617E-10	0.0194095
Docosane	1.71329E-10	4.65786E-11	3.84247E-10	3.84247E-10	0.0155276
Tricosane	4.22733E-11	3.56945E-11	1.07287E-10	1.07287E-10	0.0116457
Tetracosane	1.34621E-11	2.82934E-11	3.81017E-11	3.81017E-11	0.00970475
Pentacosane	4.6035E-12	2.25422E-11	1.42328E-11	1.42328E-11	0.0077638
Hexacosane	1.26003E-12	1.6895E-11	4.25477E-12	4.25477E-12	0.00582285
Heptacosane	2.49784E-13	1.13541E-11	9.27636E-13	9.27636E-13	0.0038819
Octacosane	1.35045E-13	1.22643E-11	5.20205E-13	5.20205E-13	0.0038819
Nonacosane	6.67017E-14	1.15803E-11	2.68243E-13	2.68243E-13	0.0038819

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:		Job:			
Location:					
Flowsheet:					
Molar Flow	VRU Vapor	Water From GPU	1	2	3
	Ibmol/h	Ibmol/h	Ibmol/h	Ibmol/h	Ibmol/h
Triacontane	1.3091E-14	5.82467E-12	5.6001E-14	5.6001E-14	0.00194095
Hentriacontane	8.72824E-14	4.88996E-71	2.29337E-13	2.29337E-13	0.00582285
Mass Fraction	VRU Vapor	Water From GPU	1	2	3
	%	%	%	%	%
Water	0.325409	99.9425	1.05962	1.05962	11.2281
Nitrogen	0.00510857	0.000145498	0.0590134	0.0590134	0.368808
Carbon Dioxide	0.0759596	0.00207177	0.200162	0.200162	0.20741
Methane	4.24029	0.0351005	18.6693	18.6693	48.4947
Ethane	16.6762	0.0121466	22.5869	22.5869	17.0914
Propane	23.8654	0.00344864	20.3421	20.3421	7.88487
i-Butane	6.36224	0.00026763	4.61495	4.61495	1.37607
n-Butane	15.0206	0.00105369	10.4939	10.4939	2.93388
2,2-Dimethylpropane	0.0494947	1.0703E-06	0.0336778	0.0336778	0.00925853
i-Pentane	6.30698	0.000197682	4.17259	4.17259	1.16089
n-Pentane	6.80922	0.0001467	4.46992	4.46992	1.25837
2,2-Dimethylbutane	0.301935	3.25873E-06	0.195857	0.195857	0.0576185
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	0.488595	9.56948E-06	0.316453	0.316453	0.0979379
2-Methylpentane	2.60344	5.57929E-05	1.68849	1.68849	0.5377
3-Methylpentane	1.66871	7.7057E-05	1.08236	1.08236	0.350077
n-Hexane	3.64372	4.62352E-05	2.36569	2.36569	0.82098
Methylcyclopentane	0.562722	3.95557E-05	0.364498	0.364498	0.120426
Benzene	0.0749965	0.000316401	0.0522225	0.0522225	0.0162574
Cyclohexane	0.497133	7.05936E-05	0.323849	0.323849	0.116268
2-Methylhexane	1.57044	1.36148E-05	1.02392	1.02392	0.441687
3-Methylhexane	1.23346	1.1581E-05	0.805171	0.805171	0.35802
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	2.3087	1.83096E-05	1.51322	1.51322	0.747256
Methylcyclohexane	1.29301	8.50974E-05	0.84575	0.84575	0.403853
Toluene	0.244508	0.000878579	0.171526	0.171526	0.0800435
n-Octane	2.41466	1.15594E-05	1.60866	1.60866	1.34311
Ethylbenzene	0.113247	0.000319461	0.0803036	0.0803036	0.0658727
m-Xylene	0.141805	0.000340043	0.100064	0.100064	0.0864327
o-Xylene	0.14897	0.000657192	0.107554	0.107554	0.0985097
n-Nonane	0.65859	1.56348E-06	0.446622	0.446622	0.748128
Decane	0.223706	2.17282E-07	0.155135	0.155135	0.586395
Undecane	0.0551412	3.18727E-08	0.0391047	0.0391047	0.368231
Dodecane	0.0119859	1.74391E-08	0.0086785	0.0086785	0.203931
Tridecane	0.0028345	9.26501E-09	0.00210545	0.00210545	0.126091
Tetradecane	0.000640189	4.42594E-09	0.000487176	0.000487176	0.0727378
Pentadecane	0.000149093	2.17856E-09	0.000115908	0.000115908	0.0446316
Hexadecane	3.38825E-05	1.10234E-09	2.70096E-05	2.70096E-05	0.024907
Heptadecane	1.10069E-05	8.01067E-10	8.99586E-06	8.99586E-06	0.0186505
Octadecane	3.45122E-06	5.17883E-10	2.89756E-06	2.89756E-06	0.0132786
Nonadecane	9.42741E-07	3.26907E-10	8.18891E-07	8.18891E-07	0.00908785
Eicosane	1.86634E-07	1.82602E-10	1.71619E-07	1.71619E-07	0.0059766
Heneicosane	6.15335E-08	1.1447E-10	5.90961E-08	5.90961E-08	0.0041822
Docosane	2.4302E-08	9.90917E-11	2.4912E-08	2.4912E-08	0.003504
Tricosane	6.267E-09	7.93659E-11	7.26988E-09	7.26988E-09	0.00274668
Tetracosane	2.08198E-09	6.5628E-11	2.69337E-09	2.69337E-09	0.0023878
Pentacosane	7.41442E-10	5.44534E-11	1.04778E-09	1.04778E-09	0.00198936
Hexacosane	2.11012E-10	4.2435E-11	3.25681E-10	3.25681E-10	0.00155136
Heptacosane	4.34305E-11	2.96089E-11	7.37217E-11	7.37217E-11	0.0010738
Octacosane	2.43456E-11	3.31607E-11	4.28651E-11	4.28651E-11	0.00111336
Nonacosane	1.24521E-11	3.24239E-11	2.28887E-11	2.28887E-11	0.00115292
Triacontane	2.52773E-12	1.68682E-11	4.94243E-12	4.94243E-12	0.000596239
Hentriacontane	1.74123E-11	1.46311E-70	2.09119E-11	2.09119E-11	0.00184806

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:		Job:			
Location:					
Flowsheet:					
<b>Mass Flow</b>		VRU Vapor	Water From GPU	1	2
		lb/h	lb/h	lb/h	lb/h
Water		0.71256	14591.6	5.07637	5.07637
Nitrogen		0.0111864	0.0212426	0.282719	0.282719
Carbon Dioxide		0.166332	0.302478	0.958926	0.958926
Methane		9.28513	5.12467	89.4401	89.4401
Ethane		36.5164	1.7734	108.208	108.208
Propane		52.2589	0.5035	97.454	97.454
i-Butane		13.9316	0.0390739	22.1091	22.1091
n-Butane		32.8912	0.153838	50.2737	50.2737
2,2-Dimethylpropane		0.10838	0.000156264	0.161342	0.161342
i-Pentane		13.8106	0.0288616	19.9898	19.9898
n-Pentane		14.9104	0.0214181	21.4143	21.4143
2,2-Dimethylbutane		0.661158	0.000475774	0.938302	0.938302
Cyclopentane		0	0	0	0
2,3-Dimethylbutane		1.0699	0.00139714	1.51605	1.51605
2-Methylpentane		5.70085	0.00814574	8.08912	8.08912
3-Methylpentane		3.65403	0.0112503	5.1853	5.1853
n-Hexane		7.97879	0.00675032	11.3334	11.3334
Methylcyclopentane		1.23221	0.00577512	1.74622	1.74622
Benzene		0.164223	0.0461944	0.250185	0.250185
Cyclohexane		1.08859	0.0103066	1.55148	1.55148
2-Methylhexane		3.43886	0.00198776	4.90535	4.90535
3-Methylhexane		2.70094	0.00169082	3.85738	3.85738
2,2,4-Trimethylpentane		0	0	0	0
n-Heptane		5.05546	0.00267319	7.24946	7.24946
Methylcyclohexane		2.83135	0.0124242	4.05178	4.05178
Toluene		0.535408	0.128272	0.821738	0.821738
n-Octane		5.28747	0.00168767	7.70669	7.70669
Ethylbenzene		0.24798	0.0466412	0.384715	0.384715
m-Xylene		0.310516	0.0496462	0.47938	0.47938
o-Xylene		0.326205	0.0959499	0.515266	0.515266
n-Nonane		1.44214	0.000228267	2.13966	2.13966
Decane		0.489858	3.17231E-05	0.743212	0.743212
Undecane		0.120745	4.6534E-06	0.187341	0.187341
Dodecane		0.0262461	2.54611E-06	0.0415765	0.0415765
Tridecane		0.0062068	1.35269E-06	0.0100867	0.0100867
Tetradecane		0.00140185	6.46185E-07	0.00233394	0.00233394
Pentadecane		0.000326474	3.18069E-07	0.000555286	0.000555286
Hexadecane		7.41938E-05	1.60941E-07	0.000129396	0.000129396
Heptadecane		2.41022E-05	1.16956E-07	4.30969E-05	4.30969E-05
Octadecane		7.55726E-06	7.56108E-08	1.38815E-05	1.38815E-05
Nonadecane		2.06435E-06	4.77283E-08	3.9231E-06	3.9231E-06
Eicosane		4.0868E-07	2.66599E-08	8.22185E-07	8.22185E-07
Heneicosane		1.34742E-07	1.67126E-08	2.83115E-07	2.83115E-07
Docosane		5.3215E-08	1.44674E-08	1.19347E-07	1.19347E-07
Tricosane		1.37231E-08	1.15874E-08	3.48282E-08	3.48282E-08
Tetracosane		4.55899E-09	9.58166E-09	1.29033E-08	1.29033E-08
Pentacosane		1.62356E-09	7.95018E-09	5.01963E-09	5.01963E-09
Hexacosane		4.6206E-10	6.1955E-09	1.56026E-09	1.56026E-09
Heptacosane		9.51013E-11	4.32288E-09	3.53182E-10	3.53182E-10
Octacosane		5.33104E-11	4.84145E-09	2.05356E-10	2.05356E-10
Nonacosane		2.72668E-11	4.73389E-09	1.09654E-10	1.09654E-10
Triacontane		5.53505E-12	2.46275E-09	2.3678E-11	2.3678E-11
Hentriacontane		3.81284E-11	2.13613E-08	1.00184E-10	1.00184E-10
<b>Volumetric Flow</b>		VRU Vapor	Water From GPU	1	2
		ft^3/h	gpm	ft^3/h	ft^3/h
Water		7.1205	29.7222	6.83762	123.95
Nitrogen		0.0729906	6.11601E-05	0.258188	4.46201
Carbon Dioxide		0.678377	0.000502436	0.533713	9.57443

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	Job:				
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Volumetric Flow	VRU Vapor ft^3/h	Water From GPU gpm	1 ft^3/h	2 ft^3/h	3 ft^3/h
Methane	104.626	0.0267721	139.014	2455.94	13224.5
Ethane	215.196	0.00625397	86.0544	1575.03	608.173
Propane	206.678	0.00151012	51.3851	962.33	-146.801
i-Butane	41.2384	0.000106864	8.65601	164.908	-45.5434
n-Butane	97.0741	0.000415051	19.5556	374.649	-104.698
2,2-Dimethylpropane	0.255584	4.00099E-07	0.0500074	0.966076	-0.297872
i-Pentane	32.3908	7.23589E-05	6.10266	119.443	-48.4112
n-Pentane	34.8842	5.37791E-05	6.53118	127.887	-42.4482
2,2-Dimethylbutane	1.28243	1.13122E-06	0.235674	4.67831	-1.23473
Cyclopentane	0	0	0	0	0
2,3-Dimethylbutane	2.06917	3.29117E-06	0.378663	7.55189	-1.92921
2-Methylpentane	11.0097	1.94466E-05	2.0234	40.2769	-10.1859
3-Methylpentane	7.05303	2.65727E-05	1.29371	25.8145	-6.32763
n-Hexane	15.3504	1.60857E-05	2.8127	56.356	-14.2728
Methylcyclopentane	2.44256	1.24554E-05	0.442542	8.91032	-2.03336
Benzene	0.353334	8.92846E-05	0.0684988	1.37819	-0.354133
Cyclohexane	2.15723	2.15992E-05	0.390438	7.91396	-2.1647
2-Methylhexane	5.61801	4.56754E-06	1.02913	20.8957	-3.67919
3-Methylhexane	4.41303	3.84916E-06	0.807187	16.4319	-2.58277
2,2,4-Trimethylpentane	0	0	0	0	0
n-Heptane	8.23018	6.15671E-06	1.51158	30.8438	-4.62917
Methylcyclohexane	4.73821	2.57512E-05	0.856029	17.6353	-2.59217
Toluene	0.959799	0.000245198	0.185636	3.81707	-0.640466
n-Octane	7.41981	3.76186E-06	1.37594	28.6139	6.78893
Ethylbenzene	0.379397	8.79181E-05	0.0732776	1.54249	0.0239891
m-Xylene	0.474206	9.40929E-05	0.0911263	1.92097	0.0723615
o-Xylene	0.498193	0.000179005	0.0975758	2.06484	0.144128
n-Nonane	1.76692	4.96548E-07	0.330257	7.03278	9.42748
Decane	0.53131	6.78966E-08	0.100559	2.18932	9.43367
Undecane	0.11704	9.82243E-09	0.0226407	0.499918	7.22048
Dodecane	0.0228773	5.31908E-09	0.00447554	0.101205	4.30585
Tridecane	0.00490289	2.81648E-09	0.000981773	0.0225633	2.76636
Tetradecane	0.00100804	1.33374E-09	0.000205459	0.00482374	1.62392
Pentadecane	0.000215289	6.53711E-10	4.42542E-05	0.00106655	1.01135
Hexadecane	4.49222E-05	3.29803E-10	9.41987E-06	0.000231777	0.569391
Heptadecane	1.34167E-05	2.37201E-10	2.87E-06	7.22289E-05	0.424457
Octadecane	3.90797E-06	1.52426E-10	8.54747E-07	2.18825E-05	0.30193
Nonadecane	9.9006E-07	9.61235E-11	2.22843E-07	5.82795E-06	0.207885
Eicosane	1.81849E-07	5.3762E-11	4.30551E-08	1.15347E-06	0.137906
Heneicosane	5.59228E-08	3.37853E-11	1.37383E-08	3.76388E-07	0.0972974
Docosane	2.06232E-08	2.90615E-11	5.38377E-09	1.50655E-07	0.0812881
Tricosane	4.959E-09	2.34989E-11	1.45495E-09	4.1796E-08	0.0645131
Tetracosane	1.53972E-09	1.95997E-11	5.00072E-10	1.47522E-08	0.0572359
Pentacosane	5.14767E-10	1.61679E-11	1.81052E-10	5.48106E-09	0.0475434
Hexacosane	1.36866E-10	1.27575E-11	5.22906E-11	1.62738E-09	0.0378439
Heptacosane	2.63576E-11	8.96168E-12	1.0966E-11	3.52431E-10	0.0265299
Octacosane	1.3902E-11	9.95225E-12	5.99723E-12	1.96541E-10	0.027348
Nonacosane	6.70621E-12	9.70684E-12	3.00122E-12	1.00817E-10	0.0283584
Triacontane	1.27803E-12	5.07115E-12	6.03845E-13	2.09135E-11	0.0148043
Hentriacontane	7.24687E-12	0	2.17191E-12	8.28794E-11	0.0510128

## Stream Properties

Property	Units	VRU Vapor	Water From GPU	1	2	3
Temperature	°F	201.935	150	597.578	153.448	59.531
Pressure	psia	39.6959	*	464.696	464.696	*
Mole Fraction Vapor	%	100	0	100	100	79.3736
Mole Fraction Light Liquid	%	0	100	0	0	7.05498
Mole Fraction Heavy Liquid	%	0	0	0	0	13.5714

Process Streams Report All Streams Tabulated by Total Phase						
Client Name:	CNX Gas Production LLC			Job:		
Location:	SHR3/40 Wellpad					
Flowsheet:	SHR3/40					
Stream Properties						
Property	Units	VRU Vapor	Water From GPU	1	2	3
Molecular Weight	lb/lbmol	46.6417	18.0166	33.763	33.763	21.7704
Mass Density	lb/ft^3	0.267986	61.1671	1.41274	0.0772	9.9834
Molar Flow	lbmol/h	4.6948	810.361	14.1893	14.1893	6322.31
Mass Flow	lb/h	218.974	14600	479.075	479.075	137639
Vapor Volumetric Flow	ft^3/h	817.108	238.69	339.111	6205.64	13786.8
Liquid Volumetric Flow	gpm	101.873	29.7588	42.2788	773.69	1718.88
Std Vapor Volumetric Flow	MMSCFD	0.0427584	7.38046	0.129231	0.129231	57.5811
Std Liquid Volumetric Flow	sgpm	0.85581	29.2183	2.16633	2.16633	714.62
Compressibility		0.973076	0.0209202	0.978832	0.993437	0.56737
Specific Gravity		1.61041	0.980729	1.16575	1.16575	
API Gravity			10.0283			
Enthalpy	Btu/h	-213454	-9.84843E+07	-459084	-580188	-3.07485E+08 ?
Mass Enthalpy	Btu/lb	-974.793	-6745.52	-958.271	-1211.06	-2233.99 ?
Mass Cp	Btu/(lb*°F)	0.4827	0.983415	0.71571	0.468637	0.844751 ?
Ideal Gas CpCv Ratio		1.09796	1.32205	1.09196	1.14416	1.24553
Dynamic Viscosity	cP	0.010153	0.436874	0.0172607	0.0104858	
Kinematic Viscosity	cSt	2.36517	0.445879	0.762737	8.47936	
Thermal Conductivity	Btu/(h*ft*°F)	0.0156499	0.376336 ?	0.0392752	0.0164179	
Surface Tension	lbf/ft		0.00444164			
Net Ideal Gas Heating Value	Btu/ft^3	2424.97	0.549532	1770.03	1770.03	1052.42
Net Liquid Heating Value	Btu/lb	19565.2	-1047.61	19750.6	19750.6	18161.1
Gross Ideal Gas Heating Value	Btu/ft^3	2633.46	50.8905	1932.01	1932.01	1164.94
Gross Liquid Heating Value	Btu/lb	21260.7	12.7226	21570.7	21570.7	20122.1
Warnings						
ProMax:ProMax!Project!Flowsheets!SHR3/40!PStreams!3						
Warning: The temperature of 59.531 °F is below hydrate formation.						
Remarks						

		Process Streams Report All Streams Tabulated by Total Phase			
Client Name:	CNX Gas Production LLC	Job:			
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Connections					
From Block	4	5			
To Block	SPLT-100	MIX-100			
	VRU Engine	XCHG-100			
Stream Composition					
Mole Fraction	4 %	5 %			
Water	0.842487	13.5686			
Nitrogen	0.00850567	0.286617			
Carbon Dioxide	0.0805028	0.102601			
Methane	12.3282	65.8098			
Ethane	25.8673	12.3744			
Propane	25.2434	3.89284			
i-Butane	5.10555	0.515424			
n-Butane	12.0537	1.09892			
2,2-Dimethylpropane	0.0319967	0.0027937			
i-Pentane	4.07725	0.35029			
n-Pentane	4.40193	0.379705			
2,2-Dimethylbutane	0.16342	0.0145561			
Cyclopentane	0	0			
2,3-Dimethylbutane	0.264448	0.024742			
2-Methylpentane	1.40909	0.135839			
3-Methylpentane	0.903174	0.0884397			
n-Hexane	1.97213	0.207404			
Methylcyclopentane	0.311864	0.031152			
Benzene	0.0447815	0.00453107			
Cyclohexane	0.275515	0.0300764			
2-Methylhexane	0.731006	0.0959635			
3-Methylhexane	0.574146	0.0777854			
2,2,4-Trimethylpentane	0	0			
n-Heptane	1.07465	0.162353			
Methylcyclohexane	0.614223	0.0895449			
Toluene	0.123773	0.0189127			
n-Octane	0.985954	0.25598			
Ethylbenzene	0.0497529	0.013508			
m-Xylene	0.0622997	0.0177241			
o-Xylene	0.0654473	0.0202006			
n-Nonane	0.239505	0.12699			
Decane	0.0733338	0.089724			
Undecane	0.0164539	0.0512869			
Dodecane	0.00328204	0.0260643			
Tridecane	0.000717102	0.0148895			
Tetradecane	0.000150511	0.00798201			
Pentadecane	3.27376E-05	0.0045743			
Hexadecane	6.97903E-06	0.0023946			
Heptadecane	2.13493E-06	0.0016885			
Octadecane	6.32512E-07	0.0011359			
Nonadecane	1.63753E-07	0.000736801			
Eicosane	3.08088E-08	0.0004605			
Heneicosane	9.67729E-09	0.000307			
Docosane	3.64934E-09	0.0002456			
Tricosane	9.00429E-10	0.0001842			
Tetracosane	2.86745E-10	0.0001535			
Pentacosane	9.80552E-11	0.0001228			
Hexacosane	2.68387E-11	9.21001E-05			
Heptacosane	5.32045E-12	6.14001E-05			
Octacosane	2.87648E-12	6.14001E-05			
Nonacosane	1.42076E-12	6.14001E-05			
Triacontane	2.78841E-13	3.07E-05			
Hentriacontane	1.85913E-12	9.21001E-05			

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Molar Flow	4 lbmol/h	5 lbmol/h			
Water	0.0395531	857.847			
Nitrogen	0.000399324	18.1208			
Carbon Dioxide	0.00377945	6.48674			
Methane	0.578785	4160.7			
Ethane	1.21442	782.348			
Propane	1.18513	246.117			
i-Butane	0.239695	32.5867			
n-Butane	0.565898	69.4773			
2,2-Dimethylpropane	0.00150218	0.176627			
i-Pentane	0.191419	22.1464			
n-Pentane	0.206662	24.0061			
2,2-Dimethylbutane	0.00767224	0.920284			
Cyclopentane	0	0			
2,3-Dimethylbutane	0.0124153	1.56426			
2-Methylpentane	0.0661541	8.58815			
3-Methylpentane	0.0424022	5.59143			
n-Hexane	0.0925878	13.1127			
Methylcyclopentane	0.0146414	1.96952			
Benzene	0.0021024	0.286468			
Cyclohexane	0.0129349	1.90152			
2-Methylhexane	0.0343193	6.06711			
3-Methylhexane	0.026955	4.91784			
2,2,4-Trimethylpentane	0	0			
n-Heptane	0.0504527	10.2645			
Methylcyclohexane	0.0288366	5.6613			
Toluene	0.00581091	1.19572			
n-Octane	0.0462886	16.1838			
Ethylbenzene	0.0023358	0.854018			
m-Xylene	0.00292485	1.12057			
o-Xylene	0.00307262	1.27715			
n-Nonane	0.0112443	8.02868			
Decane	0.00344288	5.67263			
Undecane	0.000772479	3.24251			
Dodecane	0.000154085	1.64787			
Tridecane	3.36665E-05	0.941361			
Tetradecane	7.06619E-06	0.504647			
Pentadecane	1.53697E-06	0.289202			
Hexadecane	3.27651E-07	0.151394			
Heptadecane	1.0023E-07	0.106752			
Octadecane	2.96952E-08	0.0718152			
Nonadecane	7.68787E-09	0.0465828			
Eicosane	1.44641E-09	0.0291143			
Heneicosane	4.54329E-10	0.0194095			
Docosane	1.71329E-10	0.0155276			
Tricosane	4.22733E-11	0.0116457			
Tetracosane	1.34621E-11	0.00970475			
Pentacosane	4.6035E-12	0.0077638			
Hexacosane	1.26003E-12	0.00582285			
Heptacosane	2.49784E-13	0.0038819			
Octacosane	1.35045E-13	0.0038819			
Nonacosane	6.67017E-14	0.0038819			
Triacontane	1.3091E-14	0.00194095			
Hentriacontane	8.72824E-14	0.00582285			
Mass Fraction	4 %	5 %			
Water	0.325409	11.2281			
Nitrogen	0.00510857	0.368808			
Carbon Dioxide	0.0759596	0.20741			
Methane	4.24029	48.4947			
Ethane	16.6762	17.0914			

\* User Specified Values

? Extrapolated or Approximate Values

		Process Streams Report All Streams Tabulated by Total Phase			
Client Name:	CNX Gas Production LLC	Job:			
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Mass Fraction		4 %	5 %		
Propane		23.8654	7.88487		
i-Butane		6.36224	1.37607		
n-Butane		15.0206	2.93388		
2,2-Dimethylpropane		0.0494947	0.00925853		
i-Pentane		6.30698	1.16089		
n-Pentane		6.80922	1.25837		
2,2-Dimethylbutane		0.301935	0.0576185		
Cyclopentane		0	0		
2,3-Dimethylbutane		0.488595	0.0979379		
2-Methylpentane		2.60344	0.5377		
3-Methylpentane		1.66871	0.350077		
n-Hexane		3.64372	0.82098		
Methylcyclopentane		0.562722	0.120426		
Benzene		0.0749965	0.0162574		
Cyclohexane		0.497133	0.116268		
2-Methylhexane		1.57044	0.441687		
3-Methylhexane		1.23346	0.35802		
2,2,4-Trimethylpentane		0	0		
n-Heptane		2.3087	0.747256		
Methylcyclohexane		1.29301	0.403853		
Toluene		0.244508	0.0800435		
n-Octane		2.41466	1.34311		
Ethylbenzene		0.113247	0.0658727		
m-Xylene		0.141805	0.0864327		
o-Xylene		0.14897	0.0985097		
n-Nonane		0.65859	0.748128		
Decane		0.223706	0.586395		
Undecane		0.0551412	0.368231		
Dodecane		0.0119859	0.203931		
Tridecane		0.0028345	0.126091		
Tetradecane		0.000640189	0.0727378		
Pentadecane		0.000149093	0.0446316		
Hexadecane		3.38825E-05	0.024907		
Heptadecane		1.10069E-05	0.0186505		
Octadecane		3.45122E-06	0.0132786		
Nonadecane		9.42741E-07	0.00908785		
Eicosane		1.86634E-07	0.0059766		
Heneicosane		6.15335E-08	0.0041822		
Docosane		2.4302E-08	0.003504		
Tricosane		6.267E-09	0.00274668		
Tetracosane		2.08198E-09	0.0023878		
Pentacosane		7.41442E-10	0.00198936		
Hexacosane		2.11012E-10	0.00155136		
Heptacosane		4.34305E-11	0.0010738		
Octacosane		2.43456E-11	0.00111336		
Nonacosane		1.24521E-11	0.00115292		
Triacontane		2.52773E-12	0.000596239		
Hentriacontane		1.74123E-11	0.00184806		

Mass Flow		4 lb/h	5 lb/h		
Water		0.71256	15454.4		
Nitrogen		0.0111864	507.625		
Carbon Dioxide		0.166332	285.478		
Methane		9.28513	66747.8		
Ethane		36.5164	23524.4		
Propane		52.2589	10852.7		
i-Butane		13.9316	1894.01		
n-Butane		32.8912	4038.17		
2,2-Dimethylpropane		0.10838	12.7434		
i-Pentane		13.8106	1597.84		

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Mass Flow	4 lb/h	5 lb/h			
n-Pentane	14.9104	1732.01			
2,2-Dimethylbutane	0.661158	79.3058			
Cyclopentane	0	0			
2,3-Dimethylbutane	1.0699	134.801			
2-Methylpentane	5.70085	740.087			
3-Methylpentane	3.65403	481.844			
n-Hexane	7.97879	1129.99			
Methylcyclopentane	1.23221	165.754			
Benzene	0.164223	22.3765			
Cyclohexane	1.08859	160.031			
2-Methylhexane	3.43886	607.936			
3-Methylhexane	2.70094	492.777			
2,2,4-Trimethylpentane	0	0			
n-Heptane	5.05546	1028.52			
Methylcyclohexane	2.83135	555.861			
Toluene	0.535408	110.171			
n-Octane	5.28747	1848.65			
Ethylbenzene	0.24798	90.6668			
m-Xylene	0.310516	118.965			
o-Xylene	0.326205	135.588			
n-Nonane	1.44214	1029.72			
Decane	0.489858	807.111			
Undecane	0.120745	506.832			
Dodecane	0.0262461	280.689			
Tridecane	0.0062068	173.551			
Tetradecane	0.00140185	100.116			
Pentadecane	0.000326474	61.4306			
Hexadecane	7.41938E-05	34.2819			
Heptadecane	2.41022E-05	25.6705			
Octadecane	7.55726E-06	18.2766			
Nonadecane	2.06435E-06	12.5085			
Eicosane	4.0868E-07	8.22616			
Heneicosane	1.34742E-07	5.75636			
Docosane	5.3215E-08	4.82288			
Tricosane	1.37231E-08	3.78051			
Tetracosane	4.55899E-09	3.28655			
Pentacosane	1.62356E-09	2.73814			
Hexacosane	4.6206E-10	2.13528			
Heptacosane	9.51013E-11	1.47797			
Octacosane	5.33104E-11	1.53242			
Nonacosane	2.72668E-11	1.58687			
Triacontane	5.53505E-12	0.82066			
Hentriacontane	3.81284E-11	2.54365			
Volumetric Flow	4 ft^3/h	5 ft^3/h			
Water	16.3373	250.01			
Nitrogen	0.166162	87.1089			
Carbon Dioxide	1.55761	11.7807			
Methane	239.446	13065.2			
Ethane	497.133	570.523			
Propane	480.968	-156.962			
i-Butane	96.5613	-46.4496			
n-Butane	227.618	-106.287			
2,2-Dimethylpropane	0.60154	-0.300664			
i-Pentane	76.4284	-48.5625			
n-Pentane	82.401	-42.5192			
2,2-Dimethylbutane	3.04378	-1.23057			
Cyclopentane	0	0			
2,3-Dimethylbutane	4.91783	-1.91912			
2-Methylpentane	26.1793	-10.1162			

\* User Specified Values

? Extrapolated or Approximate Values

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
Volumetric Flow		4 ft^3/h	5 ft^3/h		
3-Methylpentane		16.7769	-6.28352		
n-Hexane		36.5607	-14.1312		
Methylcyclopentane		5.80427	-2.02374		
Benzene		0.836858	-0.354092		
Cyclohexane		5.12735	-2.15766		
2-Methylhexane		13.461	-3.61777		
3-Methylhexane		10.5731	-2.53533		
2,2,4-Trimethylpentane		0	0		
n-Heptane		19.7508	-4.53614		
Methylcyclohexane		11.3387	-2.56781		
Toluene		2.2917	-0.639728		
n-Octane		17.9528	6.8078		
Ethylbenzene		0.912999	0.021291		
m-Xylene		1.14218	0.068452		
o-Xylene		1.20004	0.137838		
n-Nonane		4.31541	9.38102		
Decane		1.30888	9.36605		
Undecane		0.29084	7.16489		
Dodecane		0.0574128	4.27334		
Tridecane		0.0124194	2.74559		
Tetradecane		0.00257942	1.61209		
Pentadecane		0.000556145	1.00424		
Hexadecane		0.000117296	0.56553		
Heptadecane		3.546E-05	0.421647		
Octadecane		1.04182E-05	0.299985		
Nonadecane		2.66895E-06	0.206595		
Eicosane		4.96286E-07	0.137085		
Heneicosane		1.54351E-07	0.0967383		
Docosane		5.7599E-08	0.0808328		
Tricosane		1.40421E-08	0.064163		
Tetracosane		4.42008E-09	0.0569423		
Pentacosane		1.49619E-09	0.0473053		
Hexacosane		4.0422E-10	0.0376633		
Heptacosane		7.91146E-11	0.0264084		
Octacosane		4.23152E-11	0.0272254		
Nonacosane		2.06907E-11	0.0282348		
Triacontane		4.01069E-12	0.0147421		
Hentriacontane		2.50465E-11	0.050828		

Stream Properties					
Property	Units	4	5		
Temperature	°F	113.607	57.531		
Pressure	psia	14.9459	1454.7		
Mole Fraction Vapor	%	100	79.1351		
Mole Fraction Light Liquid	%	0	7.29161		
Mole Fraction Heavy Liquid	%	0	13.5733		
Molecular Weight	lb/lbmol	46.6417	21.7704		
Mass Density	lb/ft^3	0.115063	10.1383		
Molar Flow	lbmol/h	4.6948	6322.31		
Mass Flow	lb/h	218.974	137639		
Vapor Volumetric Flow	ft^3/h	1903.08	13576.2		
Liquid Volumetric Flow	gpm	237.267	1692.61		
Std Vapor Volumetric Flow	MMSCFD	0.0427584	57.5811		
Std Liquid Volumetric Flow	sgpm	0.85581	714.62		
Compressibility		0.98477	0.562795		
Specific Gravity		1.61041			
API Gravity					
Enthalpy	Btu/h	-221919	-3.0776E+08		
Mass Enthalpy	Btu/lb	-1013.45	-2235.99		
Mass Cp	Btu/(lb*°F)	0.428095	0.851088 ?		

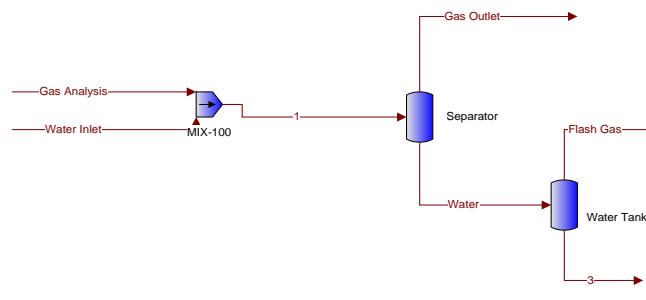
<b>Process Streams Report</b> <b>All Streams</b> Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC			Job:	
Location:	SHR3/40 Wellpad				
Flowsheet:	SHR3/40				
<b>Stream Properties</b>					
Property	Units	4	5		
Ideal Gas CpCv Ratio		1.11123	1.24602		
Dynamic Viscosity	cP	0.00881636			
Kinematic Viscosity	cSt	4.78336			
Thermal Conductivity	Btu/(h*ft*°F)	0.0120868			
Surface Tension	lbf/ft				
Net Ideal Gas Heating Value	Btu/ft^3	2424.97	1052.42		
Net Liquid Heating Value	Btu/lb	19565.2	18161.1		
Gross Ideal Gas Heating Value	Btu/ft^3	2633.46	1164.94		
Gross Liquid Heating Value	Btu/lb	21260.7	20122.1		
<b>Warnings</b>					
ProMax!Project!Flowsheets!SHR3/40!PStreams!5 Warning: The temperature of 57.531 °F is below hydrate formation.					
<b>Remarks</b>					

## Well 12386 Plant Schematic

Client Name:	CNX Gas Production LLC
Location:	Well 12386
Flowsheet:	Well 12386

Job:

### Well 12386 Produced Water Tank Calculations



Annual tank loss calculations for "Water".  
 Total working and breathing losses from the Vertical Cylinder are 3.433E-06 ton/yr.  
 Flashing losses are 0.0004272 ton/yr.  
 Loading losses are 1.964E-07 ton/yr of loaded liquid.  
 \* Only Non-Exempt VOCs are reported.  
 Vapor adjusted to ensure mass balance

Tank-1

		Process Streams Report All Streams Tabulated by Total Phase				
Client Name:	CNX Gas Production LLC				Job:	
Location:	Well 12386					
Flowsheet:	Well 12386					
Connections						
From Block	Water Tank	Flash Gas	Gas Analysis	Gas Outlet	Water	Water Inlet
To Block	--	--	MIX-100	--	Water Tank	MIX-100
Stream Composition						
Mole Fraction	Flash Gas %	Gas Analysis %	Gas Outlet %	Water %	Water Inlet %	
Methane		82.1793 *				0 *
Ethane		11.5654 *				0 *
Propane		3.1008 *				0 *
i-Butane		0.6111 *				0 *
n-Butane		0.9566 *				0 *
i-Pentane		0.3214 *				0 *
n-Pentane		0.2164 *				0 *
Nitrogen		0.5436 *				0 *
Carbon Dioxide		0.0839 *				0 *
Hexane		0.4215 *				0 *
Water		0 *				100 *
Mass Flow	Flash Gas lb/h	Gas Analysis lb/h	Gas Outlet lb/h	Water lb/h	Water Inlet lb/h	
Methane		4342.6 *				0 *
Ethane		1145.5 *				0 *
Propane		450.387 *				0 *
i-Butane		116.996 *				0 *
n-Butane		183.142 *				0 *
i-Pentane		76.3821 *				0 *
n-Pentane		51.4284 *				0 *
Nitrogen		50.1605 *				0 *
Carbon Dioxide		12.1626 *				0 *
Hexane		119.646 *				0 *
Water		0 *				20.4261 *
Volumetric Flow	Flash Gas ft^3/h	Gas Analysis ft^3/h	Gas Outlet ft^3/h	Water gpm	Water Inlet ft^3/h	
Methane						
Ethane						
Propane						
i-Butane						
n-Butane						
i-Pentane						
n-Pentane						
Nitrogen						
Carbon Dioxide						
Hexane						
Water						
Stream Properties						
Property	Units	Flash Gas	Gas Analysis	Gas Outlet	Water	Water Inlet
Temperature	°F		90 *			90 *
Pressure	psia	14.9459 *	214.696 *	209.696	209.696	214.696 *
Mole Fraction Vapor	%	100		100	0	
Mole Fraction Light Liquid	%					
Mole Fraction Heavy Liquid	%					
Molecular Weight	lb/lbmol		19.8801			18.0153
Mass Density	lb/ft^3					
Molar Flow	lbmol/h		329.395			1.13382
Mass Flow	lb/h		6548.41			20.4261
Vapor Volumetric Flow	ft^3/h					
Liquid Volumetric Flow	gpm					

Process Streams Report All Streams Tabulated by Total Phase						
Client Name:	CNX Gas Production LLC			Job:		
Location:	Well 12386					
Flowsheet:	Well 12386					
Stream Properties						
Property	Units	Flash Gas	Gas Analysis	Gas Outlet	Water	Water Inlet
Std Vapor Volumetric Flow	MMSCFD		3 *			0.0103264
Std Liquid Volumetric Flow	sgpm		39.1169			0.0408333 *
Compressibility						
Specific Gravity						
API Gravity						
Enthalpy	Btu/h					
Mass Enthalpy	Btu/lb					
Mass Cp	Btu/(lb*°F)					
Ideal Gas CpCv Ratio			1.25388			1.32489
Dynamic Viscosity	cP					
Kinematic Viscosity	cSt					
Thermal Conductivity	Btu/(h*ft*°F)					
Surface Tension	lbf/ft					
Net Ideal Gas Heating Value	Btu/ft^3		1091.98			0
Net Liquid Heating Value	Btu/lb		20793.6			-1059.76
Gross Ideal Gas Heating Value	Btu/ft^3		1205.36			50.3101
Gross Liquid Heating Value	Btu/lb		22958			0
Remarks						

Process Streams Report All Streams Tabulated by Total Phase					
Client Name:	CNX Gas Production LLC		Job:		
Location:	Well 12386				
Flowsheet:	Well 12386				
Connections					
From Block	1	3			
MIX-100	MIX-100	Water Tank			
To Block	Separator	--			
Stream Composition					
Mole Fraction	1 %	3 %			
Methane	81.8974				
Ethane	11.5257				
Propane	3.09016				
i-Butane	0.609004				
n-Butane	0.953319				
i-Pentane	0.320297				
n-Pentane	0.215658				
Nitrogen	0.541735				
Carbon Dioxide	0.0836122				
Hexane	0.420054				
Water	0.343033				
Mass Flow	1 lb/h	3 lb/h			
Methane	4342.6				
Ethane	1145.5				
Propane	450.387				
i-Butane	116.996				
n-Butane	183.142				
i-Pentane	76.3821				
n-Pentane	51.4284				
Nitrogen	50.1605				
Carbon Dioxide	12.1626				
Hexane	119.646				
Water	20.4261				
Volumetric Flow	1 ft^3/h	3 gpm			
Methane					
Ethane					
Propane					
i-Butane					
n-Butane					
i-Pentane					
n-Pentane					
Nitrogen					
Carbon Dioxide					
Hexane					
Water					
Stream Properties					
Property	Units	1	3		
Temperature	°F				
Pressure	psia	214.696	14.9459		
Mole Fraction Vapor	%		0		
Mole Fraction Light Liquid	%				
Mole Fraction Heavy Liquid	%				
Molecular Weight	lb/lbmol	19.8737			
Mass Density	lb/ft^3				
Molar Flow	lbmol/h	330.529			
Mass Flow	lb/h	6568.84			
Vapor Volumetric Flow	ft^3/h				
Liquid Volumetric Flow	gpm				

		<b>Process Streams Report</b> <b>All Streams</b> Tabulated by Total Phase				
Client Name:	CNX Gas Production LLC				Job:	
Location:	Well 12386					
Flowsheet:	Well 12386					
<b>Stream Properties</b>						
Property	Units	1	3			
Std Vapor Volumetric Flow	MMSCFD	3.01033				
Std Liquid Volumetric Flow	sgpm	39.1577				
Compressibility						
Specific Gravity						
API Gravity						
Enthalpy	Btu/h					
Mass Enthalpy	Btu/lb					
Mass Cp	Btu/(lb*°F)					
Ideal Gas CpCv Ratio						
Dynamic Viscosity	cP					
Kinematic Viscosity	cSt					
Thermal Conductivity	Btu/(h*ft*°F)					
Surface Tension	lbf/ft					
Net Ideal Gas Heating Value	Btu/ft^3	1088.23				
Net Liquid Heating Value	Btu/lb	20725.7				
Gross Ideal Gas Heating Value	Btu/ft^3	1201.4				
Gross Liquid Heating Value	Btu/lb	22886.7				
Remarks						

**J-W Measurement Company**

Shreveport, LA Tyler, TX Victoria, TX Midland, TX  
Fairfield, TX Oklahoma City, OK Mounds, OK Tulsa, OK  
**WWW.JWOPERATING.COM**  
**888-226-9110**

<b>JWMC Number:</b>	NOEK1011	<b>Run Date:</b>	11/13/12
<b>Customer Name:</b>	NOBLE ENERGY		
<b>Station Name:</b>	SHL 3-B	<b>Eff. Date:</b>	12/1/2012
<b>Station Number:</b>	G05101365	<b>Sampled by:</b>	AR
<b>Producer:</b>		<b>Procure Date:</b>	11/06/12
<b>Field:</b>	MARCELLUS SAHLE	<b>Pressure (lbs.):</b>	286.00
<b>Co. or Pr.:</b>	MARSHALL	<b>Temperature (° F):</b>	97
<b>State:</b>	WV.	<b>Bottle Number:</b>	4793

**Remarks:**

<b>Component</b>	<b>Mole Percent</b>	<b>GPM @ 14.696 Ideal BTU @ 14.696</b>	
Hydrogen Sulfide	0.0001		
Nitrogen	0.3429		
Methane	78.4994		792.84
Carbon Dioxide	0.1218		0.00
Ethane	14.4282	3.849	255.34
Propane	4.2648	1.172	107.31
I-Butane	0.5059	0.165	16.45
N-Butane	1.0173	0.320	33.19
I-Pentane	0.2517	0.092	10.07
N-Pentane	0.2439	0.088	9.78
2,2-Dimethylbutane	0.0084	0.003	0.40
2,3-Dimethylbutane	0.0127	0.005	0.60
2-Methylpentane	0.0596	0.025	2.83
3-Methylpentane	0.0374	0.015	1.78
n-Hexane	0.0740	0.030	3.52
2,2-Dimethylpentane	0.0015	0.001	0.08
Methylcyclopentane	0.0089	0.003	0.40
Benzene	0.0012	0.000	0.04
3,3-Dimethylpentane	0.0000	0.000	0.00
Cyclohexane	0.0068	0.002	0.30
2-Methylhexane	0.0247	0.011	1.36
2,3 dimethylpentane	0.0046	0.002	0.25
3- methylhexane	0.0177	0.008	0.97
1t,2-Dimethylcyclopentane	0.0008	0.000	0.04
1c,2-Dimethylcyclopentane	0.0002	0.000	0.01
n-heptane	0.0217	0.010	1.19
Methylcyclohexane	0.0117	0.005	0.61
2,5-Dimethylhexane	0.0011	0.001	0.07
2,4-Dimethylhexane	0.0016	0.001	0.10
Toluene	0.0028	0.001	0.13
2-Methylheptane	0.0044	0.002	0.27
4-Methylheptane	0.0025	0.001	0.16

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 Fairfield, TX Oklahoma City, OK Mounds, OK Tulsa, OK  
**WWW.JWOPERATING.COM**  
**888-226-9110**

<b>Customer Name:</b>	NOBLE ENERGY	<b>Eff. Date:</b>	12/1/2012
<b>Station Name:</b>	SHL 3-B	<b>Sampled by:</b>	AR
<b>Station Number:</b>	G05101365		
3-Methylheptane	0.0026	0.001	0.16
1c,2-Dimethycyclohexane	0.0015	0.001	0.09
N-Octane	0.0056	0.003	0.35
1t,2-Dimethylcyclohexane	0.0000	0.000	0.00
1t,3-Dimethylcyclohexane	0.0000	0.000	0.00
1c,3-Dimethylcyclohexane	0.0006	0.000	0.04
Ethylcyclohexane	0.0005	0.000	0.03
Ethylbenzene	0.0000	0.000	0.00
M-Xylene	0.0027	0.001	0.14
P-Xylene	0.0015	0.001	0.08
O-Xylene	0.0000	0.000	0.00
N-Nonane	0.0023	0.001	0.16
Decanes	0.0019	0.001	0.15
Undecanes	0.0005	0.000	0.04
<b>TOTAL</b>	<b>100.0000</b>	<b>5.823</b>	<b>1241.33</b>
<b>Ideal Gravity</b>	0.7079	<b>Real Gravity</b>	0.7104
<b>Compressibility Factor (Z) @ 14.696 PSIA &amp; 60 DEG. F =</b>			0.9965
<b>Base Pressures</b>	<b>14.73</b>	<b>14.65</b>	<b>15.025</b>
GPM	5.837	5.805	5.954
<i>Ideal BTU Dry</i>	1244.20	1237.45	1269.12
<i>Ideal BTU Sat.</i>	1222.55	1215.79	1247.42
<i>Real BTU Dry</i>	1248.52	1241.72	1273.61
<i>Real BTU Sat.</i>	1226.80	1219.99	1251.84

Note: Calibration, Standards, and testing procedures  
 are achieved pursuant to GPA regulations.

This Analysis Report is not intended for submission to  
 Louisiana Department of Environmental Quality.

**J-W ANALYST**

**DISTRIBUTION:**

1

35

**FESCO, Ltd.**  
**1100 FESCO Avenue - Alice, Texas 78332**

**For:** Noble Energy, Inc.  
 333 Technology Drive  
 Canonsburg, Pennsylvania 15317

**Sample:** SHR No. 1-A  
 Separator Hydrocarbon Liquid  
 Sampled @ 446 psig & 76 °F

Date Sampled: 06/03/15

Job Number: 53145.002

**CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M**

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.023	0.007	0.009
Carbon Dioxide	0.034	0.016	0.021
Methane	11.625	5.419	2.567
Ethane	11.210	8.247	4.639
Propane	10.972	8.315	6.659
Isobutane	3.019	2.718	2.415
n-Butane	8.166	7.082	6.532
2,2 Dimethylpropane	0.091	0.096	0.090
Isopentane	4.574	4.602	4.542
n-Pentane	5.744	5.728	5.704
2,2 Dimethylbutane	0.246	0.282	0.291
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.461	0.520	0.547
2 Methylpentane	2.806	3.204	3.328
3 Methylpentane	1.865	2.095	2.212
n-Hexane	4.746	5.368	5.628
Heptanes Plus	<u>34.417</u>	<u>46.300</u>	<u>54.815</u>
Totals:	100.000	100.000	100.000

**Characteristics of Heptanes Plus:**

Specific Gravity -----	0.7498 (Water=1)
°API Gravity -----	57.21 @ 60°F
Molecular Weight -----	115.7
Vapor Volume -----	20.57 CF/Gal
Weight -----	6.25 Lbs/Gal

**Characteristics of Total Sample:**

Specific Gravity -----	0.6334 (Water=1)
°API Gravity -----	91.91 @ 60°F
Molecular Weight-----	72.7
Vapor Volume -----	27.67 CF/Gal
Weight -----	5.28 Lbs/Gal

Base Conditions: 14.850 PSI &amp; 60 °F

Certified:

FESCO, Ltd. Alice, Texas  
  
 David Dannhaus 361-661-7015

Analyst: XG  
 Processor: XGdjv  
 Cylinder ID: W-1105

**TANKS DATA INPUT REPORT - GPA 2186-M**

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.034	0.016	0.021
Nitrogen	0.023	0.007	0.009
Methane	11.625	5.419	2.567
Ethane	11.210	8.247	4.639
Propane	10.972	8.315	6.659
Isobutane	3.019	2.718	2.415
n-Butane	8.257	7.178	6.623
Isopentane	4.574	4.602	4.542
n-Pentane	5.744	5.728	5.704
Other C-6's	5.378	6.101	6.379
Heptanes	10.775	13.117	14.499
Octanes	10.785	13.695	16.055
Nonanes	4.073	5.998	7.112
Decanes Plus	6.525	11.209	13.998
Benzene	0.115	0.089	0.124
Toluene	0.540	0.498	0.685
E-Benzene	0.440	0.467	0.643
Xylenes	1.162	1.226	1.698
n-Hexane	4.746	5.368	5.628
2,2,4 Trimethylpentane	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>
Totals:	100.000	100.000	100.000

**Characteristics of Total Sample:**

Specific Gravity -----	0.6334 (Water=1)
°API Gravity -----	91.91 @ 60°F
Molecular Weight-----	72.7
Vapor Volume -----	27.67 CF/Gal
Weight -----	5.28 Lbs/Gal

**Characteristics of Decanes (C10) Plus:**

Specific Gravity -----	0.7909 (Water=1)
Molecular Weight-----	155.9

**Characteristics of Atmospheric Sample:**

°API Gravity -----	69.21 @ 60°F
Reid Vapor Pressure Equivalent (D-5191)-----	11.62 psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	-----	W-1105*	W-1254
Pressure, PSIG	446	430	414
Temperature, °F	76	70	70

\* Sample used for analysis

**ATTACHMENT U**

**Emission Summary Sheet**

## ATTACHMENT U – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	NO <sub>x</sub>		CO		VOC		SO <sub>2</sub>		PM <sub>10</sub>		PM <sub>2.5</sub>		CH <sub>4</sub>		GHG (CO <sub>2</sub> e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
3S-ENG3/9E-COMB1 <b>(1S-TK5 to 1S-TK8)</b>	---	---	---	---	1.47	6.42	---	---	---	---	---	---	1.88	8.25	47.07	206.18
3S-ENG3/9E-COMB1 <b>(2S-TK1 to 2S-TK4)</b>	---	---	---	---	0.02	0.07	---	---	---	---	---	---	0.00	0.01	0.04	0.16
9E-COMB1, 10E-PILOT <b>(8S-TL2)</b>	---	---	---	---	2.4E-05	6.3E-06	---	---	---	---	---	---	---	---	---	---
9E-COMB1, 10E-PILOT <b>(7S-TL1)</b>	---	---	---	---	0.89	0.23	---	---	---	---	---	---	---	---	---	---
3E-ENG1	0.20	0.89	0.41	1.78	0.11	0.49	2.9E-04	1.3E-03	0.01	0.04	0.01	0.04	0.00	0.00	52.29	229.02
3E-ENG2	0.20	0.89	0.41	1.78	0.11	0.49	2.9E-04	1.3E-03	0.01	0.04	0.01	0.04	0.00	0.00	52.29	229.02
3E-ENG3	0.20	0.89	0.41	1.78	0.11	0.49	2.9E-04	1.3E-03	0.01	0.04	0.01	0.04	0.00	0.00	52.29	229.02
9E-COMB1, 10E-PILOT	0.86	3.75	0.72	3.15	0.00	0.00	0.01	0.02	0.07	0.29	0.07	0.29	0.00	0.00	1,023.13	4,481.29
11E-FLARE, 12E-PILOT	1.79	7.83	8.15	35.68	0.05	0.22	---	---	---	---	---	---	0.00	0.00	3,075.82	13,472.11
4E-GPU1	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03	0.01	0.03	0.01	0.03	0.00	0.01	117.12	512.98
4E-GPU2	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03	0.01	0.03	0.01	0.03	0.00	0.01	117.12	512.98
4E-GPU3	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03	0.01	0.03	0.01	0.03	0.00	0.01	117.12	512.98
4E-GPU4	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03	0.01	0.03	0.01	0.03	0.00	0.01	117.12	512.98
4E-GPU5	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03	0.01	0.03	0.01	0.03	0.00	0.01	117.12	512.98
4E-GPU6	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03	0.01	0.03	0.01	0.03	0.00	0.01	117.12	512.98
4E-GPU7	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03	0.01	0.03	0.01	0.03	0.00	0.01	117.12	512.98
4E-GPU8	0.08	0.35	0.07	0.29	4.4E-03	0.02	4.8E-04	2.1E-03	0.01	0.03	0.01	0.03	0.00	0.01	117.12	512.98
5E-LH	0.12	0.53	0.10	0.44	0.01	0.03	7.2E-04	3.2E-03	0.01	0.04	0.01	0.04	0.00	0.01	175.68	769.47
6E-LP	0.08	0.35	0.07	0.29	0.00	0.02	4.8E-04	2.1E-03	0.01	0.03	0.01	0.03	0.00	0.01	117.12	512.98
7E-TL1	---	---	---	---	19.03	4.95	---	---	---	---	---	---	---	---	---	---
8E-TL2	---	---	---	---	5.2E-04	1.3E-04	---	---	---	---	---	---	---	---	---	---

Fugitives	---	---	---	---	---	12.51	---	---	---	---	---	---	---	34.13	---	853.32
Blowdowns	---	---	---	---	---	2.47	---	---	---	---	---	---	---	1.20	---	29.89
Haul Roads	---	---	---	---	---	---	---	---	3.01	---	0.30	---	---	---	---	
<b>Facility Total</b>	4.09	17.93	10.79	47.25	21.84	28.54	0.01	0.05	0.16	3.70	0.16	0.99	1.91	43.69	5,532.66	25,116.27
<b>Facility Total (excluding fugitives)</b>	4.09	17.93	10.79	47.25	21.84	13.56	0.01	0.05	0.16	0.69	0.16	0.69	1.91	8.37	5,532.66	24,232.91

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

## ATTACHMENT U – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
3S-ENG3/9E-COMB1 <i>(1S-TK5 to 1S-TK8)</i>	---	---	8.1E-04	3.6E-03	2.2E-03	9.8E-03	8.8E-04	3.9E-03	2.2E-03	9.8E-03	0.04	0.17	0.06	0.25
3S-ENG3/9E-COMB1 <i>(2S-TK1 to 2S-TK4)</i>	---	---	1.1E-04	4.6E-04	3.8E-04	1.7E-03	1.5E-04	6.5E-04	4.5E-04	1.9E-03	0.00	0.00	0.00	0.01
9E-COMB1, 10E-PILOT <i>(8S-TL2)</i>	---	---	3.6E-07	9.3E-08	2.7E-07	7.0E-08	3.2E-08	8.3E-09	8.3E-08	2.2E-08	0.00	0.00	0.00	0.00
9E-COMB1, 10E-PILOT <i>(7S-TL1)</i>	---	---	2.9E-04	7.6E-05	8.2E-04	2.1E-04	3.5E-04	9.1E-05	9.4E-04	2.4E-04	0.02	0.01	0.03	0.01
3E-ENG1	0.01	0.04	7.8E-04	3.4E-03	2.8E-04	1.2E-03	1.2E-05	5.4E-05	9.7E-05	4.2E-04	---	---	0.02	0.07
3E-ENG2	0.01	0.04	7.8E-04	3.4E-03	2.8E-04	1.2E-03	1.2E-05	5.4E-05	9.7E-05	4.2E-04	---	---	0.02	0.07
3E-ENG3	0.01	0.04	7.8E-04	3.4E-03	2.8E-04	1.2E-03	1.2E-05	5.4E-05	9.7E-05	4.2E-04	---	---	0.02	0.07
9E-COMB1, 10E-PILOT	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11E-FLARE, 12E-PILOT	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4E-GPU1	6.01E-05	2.63E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	0.01	1.53E-03	0.01
4E-GPU2	6.01E-05	2.63E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	0.01	1.53E-03	0.01
4E-GPU3	6.01E-05	2.63E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	0.01	1.53E-03	0.01
4E-GPU4	6.01E-05	2.63E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	0.01	1.53E-03	0.01
4E-GPU5	6.01E-05	2.63E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	0.01	1.53E-03	0.01
4E-GPU6	6.01E-05	2.63E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	0.01	1.53E-03	0.01
4E-GPU7	6.01E-05	2.63E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	0.01	1.53E-03	0.01
4E-GPU8	6.01E-05	2.63E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	0.01	1.53E-03	0.01
5E-LH	9.01E-05	3.95E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	0.01	1.53E-03	0.01
6E-LP	6.01E-05	2.63E-04	1.68E-06	7.37E-06	2.72E-06	1.19E-05	---	---	---	---	1.44E-03	6.3E-03	1.53E-03	0.01
8E-TL2	---	---	7.66E-06	1.99E-06	5.81E-06	1.51E-06	6.9E-07	1.8E-07	1.8E-06	4.6E-07	2.01E-08	5.2E-09	1.60E-05	4.2E-06

7E-TL1,	---	---	6.28E-03	1.63E-03	0.02	0.00	7.52E-03	1.95E-03	2.01E-02	5.22E-03	0.48	0.13	0.67	0.17
Fugitives	---	---	---	3.41E-03	---	0.01	---	0.0E+00	---	0.02	---	0.23	---	0.42
Blowdowns	---	---	---	1.90E-03	---	0.01	---	0.0E+00	---	0.01	---	0.13	---	0.42
Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<b>Facility Total</b>	0.03	0.14	2.4E-03	0.02	0.02	0.03	8.9E-03	6.7E-03	0.02	0.04	0.56	0.73	0.82	1.56
<b>Facility Total (excluding fugitives)</b>	0.03	0.14	9.9E-03	0.02	2.2E-02	2.0E-02	8.9E-03	6.7E-03	2.4E-02	1.8E-02	0.56	0.37	0.82	0.72

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

**ATTACHMENT V**

**Class I Legal Advertisement**

# RECOMMENDED PUBLIC NOTICE TEMPLATE

## AIR QUALITY PERMIT NOTICE Notice of Application

Notice is given that CNX Gas Company LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-D General Permit Registration for an existing natural gas production facility, Shirley-3/40 (SHR-3/40), located on WV-18 North, near Alma, in Tyler County, West Virginia. The latitude and longitude coordinates are: 39.41417 N, -80.83432 W.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

Pollutant	Emissions in tpy (tons per year)
NOx	17.93
CO	47.25
VOC	13.56
SO <sub>2</sub>	0.05
PM	0.69
Formaldehyde	0.14
Benzene	0.02
Toluene	0.03
Ethylbenzene	6.7E-03
Xylene	0.04
n-Hexane	0.73
Total HAPs	1.56
Carbon Dioxide Equivalents (CO <sub>2</sub> e)	24,233.07

Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57<sup>th</sup> Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the (Day) day of (Month), 2017.

By: CNX Gas Company LLC  
Carol Phillips, Midstream Permitting Manager  
1000 CONSOL Energy Drive  
Canonsburg, PA 15317

**ATTACHMENT W**

**General Permit Registration Application Fee**